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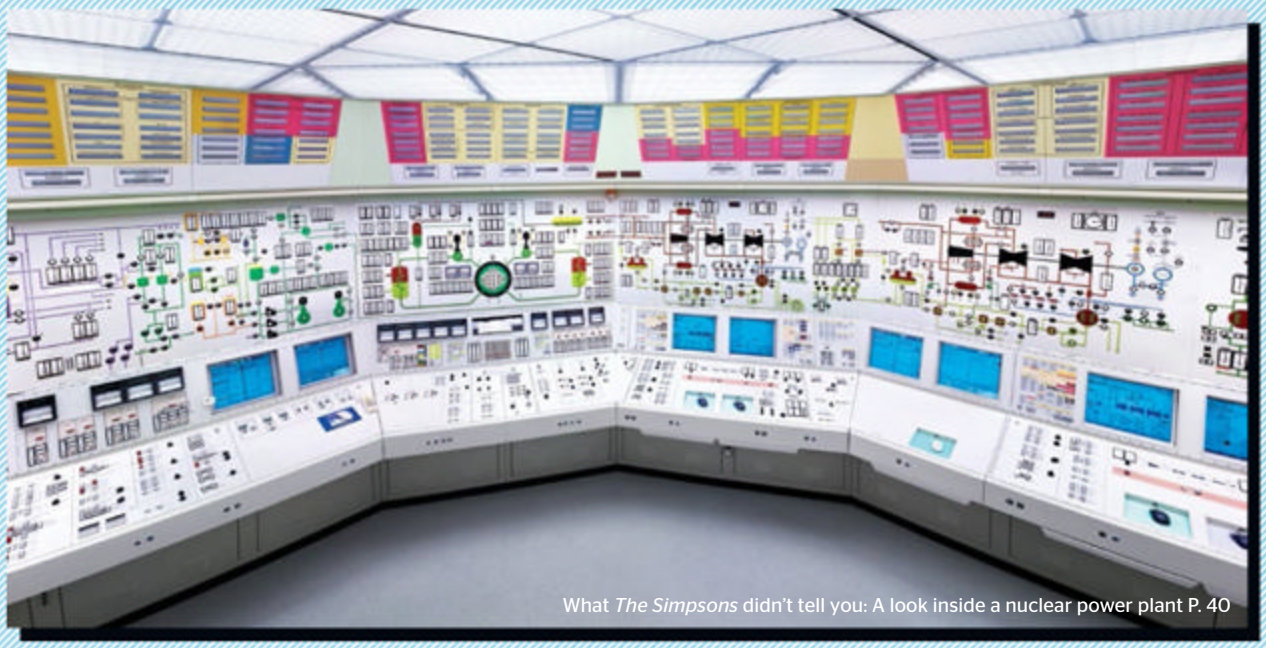

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PHOTOGRAPHY BY LUCA ZANIER

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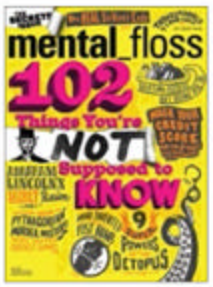

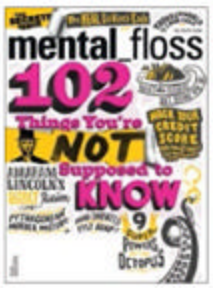

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Very Puzzling

For me, there's no one who embodies the spirit of exotic intrigue more than Belinda Carlisle. I know that's a lot to just throw out there, so allow me to back up a bit.

It starts with *Nancy Drew*. I spent the bulk of 1987 in the thrall of those musty yellow hardbacks, enraptured by the spine-tingling adventures of Nancy and her sidekicks, the tomboy George, and pudgy, pretty Bess. And Belinda!

Belinda wasn't a *Nancy Drew* character, of course. She's a pop singer. But as I've shared here before, I had a special relationship with the Top 40. So as I read *Nancy Drew*, I listened to the radio. And at the time, Belinda's song "Circle in the Sand" was in rotation round the clock. All these years later, I'm still not sure a more mysterious, exotic song has ever been written. The sun goes down. A cold wind picks up. The tide moves in. And then: the enigmatic circle in the sand appears. To my 8-year-old brain, this wasn't a love song: it was plainly the moment before a helicopter full of international bandits lands, carrying rare artifacts that will reveal the secrets of a long-lost ancient civilization!

To this day, Belinda Carlisle's voice is permanently knit in my mind with library-book smell and the thrill of amateur detective work. It's evocative not only of a place but also a special state of hyper-awareness for which I'm not sure there's a name: the sense that there is something out there, very close by, just waiting to be discovered.

It's a feeling I got this month reading our story about the Voynich manuscript, a centuries-old volume of truly bizarre renderings that has stumped the world's best cryptanalysts. I could relate to the passionate amateurs who've made it their mission to decode bits of this baffling text piece by piece. Who can resist the call of a puzzle like that? It's a feeling I hope this whole issue—in which we unearth the thrilling secrets of Pythagoreans (page 38), cephalopods (page 36), and the banana aisle (page 52), among other things—leaves you with. If at any point you want to amplify the effect, you know the soundtrack I'd suggest.

jessanne

@jessanne

A PEEK BEHIND THE SCENES AT OUR STEAMY COUCH POTATO PHOTO SHOOT.
THIS IS ME.
THIS IS MY CAT, OVERSEEING ONE OF THIS MONTH'S MOST BAFFLING PUZZLES.
THIS IS THE VIEW FROM MY DESK. WHAT'S THAT? OH, JUST OUR NEW NATIONAL MAGAZINE AWARD NOMINATION!
National Magazine Award
BELINDA CARLISLE, WOMAN OF ELEMENTARY SCHOOL INTRIGUE.

PHOTOGRAPHY BY BETH PERKINS (JESSANNE); ALAMY (BELINDA CARLISLE)

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BESS LOVEJOY, the author of *Rest in Pieces: The Curious Fates of Famous Corpses,* says that while writing "The Secret History of the Pencil" (page 46), she took a particular liking to inventor Nicolas-Jacques Conté after coming across a fetching engraving of him wearing a sash over one eye: "It was tempting to think he'd lost the eye during an ill-fated pencil experiment, although that wasn't the case."

While researching "The Secret Origins of 7 Extremely Important Actions" (page 42), **JULIE WINTERBOTTOM** became obsessed with learning how to perfom the French "Gallic shrug." Her latest obsession? Fear. She's working on a book called *Flightopedia*, chronicling everything humans dread, from arachnids to zombies.

After working on "6 Secrets of Supermarkets" (page 52), San Francisco illustrator **SHANNON MAY**, who's also contributed to Grantland, *The New York Times*, and *O, The Oprah Magazine*, says she'll bring a Pantone swatch book with her to the grocery store from now on. It's the only way to get the perfect banana.

After designing the cover of this issue, illustrator **JEFF ROGERS**, who's based in Brooklyn and has contributed to *Esquire* and *Wired*, wants to travel the world by lawn chair. He says a slew of "top secret and mysterious" projects have recently popped up for him. We'll just assume that one of those is building his own floating lawn chair (page 18).

COURTESY LOVEJOY, WINTERBOTTOM, MAY, ROGERS

mental_floss (USPS#021-941) (ISSN#1543-4702) is published 9 times per year, January/February, March/April, May, June, July/August, September, October, November, and December, by Mental Floss Inc., 55 West 39th Street, 5th Floor, New York, NY 10018. Periodical postage paid at New York, NY and additional mailing offices. POSTMASTER: Send address changes to Mental Floss c/o Palm Coast Data, P.O. Box 421142, Palm Coast, FL 32142. Basic subscription rate: One year (9 issues) $27.97; Two years (18 issues) $47.97; Canada: Add $10 per year; International: Add $35 per year.

International Newsstand Distribution by Curtis Circulation Company, New Milford, N.J. **LEGAL SERVICES:** Jacobs & Burleigh LLP; **ACCOUNTING ASSISTANCE:** Stone, Avant and Co. P.C. Entire contents copyright 2014, Mental Floss, Inc. All rights reserved. Reproduction in whole or in part without permission is prohibited. Products named in these pages are tradenames or trademarks of their respective companies. Printed in the USA. Mental Floss is a registered trademark owned by Felix Dennis.

Old-Fashioned Letter of the Month

Some might call the factoids in *mental_floss* odd, but I find them fascinating and useful. Your cleverly written bulletin of science, history, and literature entertains and teaches at the same time. Thank you for your magazine and what it has done for my past, present, and future schooling.

—EMMA GONZALES, FIFTH GRADER

TRIVIA ISN'T TRIVIAL

Thank you, *mental_floss*! If it wasn't for my addiction to your magazine, my team wouldn't have placed third out of 77 teams at the Battle of the Brains trivia night, supporting the Alzheimer's Association.

—Carrie Deslippe

THE MYSTIQUE MAGIC

I'd just like to say that, as an avid Quiz Bowl member—where we answer trivia questions based on any category—you have helped me so much. At our last competition I knew the answer to a question about *The Feminine Mystique*. The article about Betty Friedan ["The Feminine Mystique," January/February 2013], although published a LONG time ago, has continued to stick in my head ever since. Thank you for making me smarter.

—Zoe Morrison

OBTUSE ABOUT OBSIDIAN

I'm surprised you would refer to "carving" obsidian ["A Real Glass Act," March/April 2015]. Like flint and other conchoidal fracturing stone, obsidian is knapped. That process results in the edge that is less ragged than surgical steel. Thick glass bottles like those used for carbonated drinks can also be knapped into "arrowheads." Keep up your great work. Hope I don't catch you knapping again!

—Rev. David Gravitt

MORE COMPELLING THAN CRIME FICTION

The delivery of the latest issue of *mental_floss* is the only reason for which I will set aside the J.D. Robb [the pen name Nora Roberts uses for her In Death series] book I'm reading.

—Patricia Posito

Just happened to grab your magazine for the first time ever. One word: FANTabulous.

@petofallas

What up! One of my favorite comics @kumailn on the cover of one of my favorite magazines @mental_floss

@dustedunlap

@kumailn on the cover of *mental_floss*, yes please! #HomeRun!

@RebbaReb

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MENTAL FLAWS

A few speed racers were quick to point out that our description of maglev trains ["8 Crazy Trains in History," January/February 2015] failed to note that the Shanghai Maglev Train has been operating since 2004.

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MAKE DINNER LIKE A VIKING ›

WHY DO WE SAY "COUCH POTATO"?

CARTOONIST ROBERT ARMSTRONG LOVED TELEVISION. He spent hours every day ritually gazing into the box. So when his friend Tom Iacino called in July 1976 and Armstrong's girlfriend answered the phone, Iacino knew exactly where Armstrong was—the sofa. "Hey, is the couch potato there?" Iacino said, making a pun of "boob tube" and "tuber." Armstrong was so amused by the phrase he published a cartoon of a potato kicking back on a couch. And he didn't stop there: He soon formed an all-male club of TV junkies called the "Couch Potatoes,"[1] published an official newsletter called *The Tuber's Voice*, and even trademarked the term to sell Couch Potato dolls, bumper stickers, and baseball caps. By 1990, the phrase had cemented itself into the lexicon—despite mounting protest. In 2005, members of Britain's Potato Council complained the phrase was hurting farmers' business and picketed outside Oxford University Press, demanding that it be removed from the Oxford English Dictionary. They suggested a more potato-friendly replacement: "Couch slouch."

PHOTOGRAPHY BY CARY NORTON

[1] A women's splinter group, the "Couch Tomatoes," didn't gain as much steam.

New York City's Most Moving Tradition

If you think driving a U-Haul is scary, you should have seen the old days.

FOR SOME 200 YEARS, the busiest day in New York City was neither Thanksgiving nor New Year's Eve. It was May 1, when, at 9:00 a.m., everybody's apartment lease expired. All at once, hundreds of thousands of people had to grab their things and move to a new home.

Every year, bedlam ensued. Horses and carriages clogged the roads, beds and bureaus rendered walkways impassable, and people's belongings spilled into the streets. "Rich furniture and ragged furniture, carts, wagons, and drays, ropes, canvas, and straw, packers, porters, and draymen, white, yellow, and black, occupy the streets from east to west, from north to south, on this day," wrote Frances Trollope in 1832. Two years later, Davy Crockett witnessed the fiasco firsthand, saying, "It seemed to me that the city was flying before some awful calamity."

To make matters more exciting, people weren't just moving out of houses—some landowners took the opportunity to tear old houses down. "Brickbats, rafters, and slates are showering down in every direction," wrote former New York City mayor Philip Hone in 1839. Everybody could expect to see their furniture get trashed, too. An 1855 *New York Times* editorial cautioned movers that their possessions would "grow very old 'twixt morning and night," advising them to buy some nails, glue, putty, and a pint of varnish to buff out the inevitable scratches.

Why May 1? It was city legend that May Day was when Henry Hudson and his Dutch crew on the *Halve Maen* had set out for Manhattan. That wasn't actually true, but early New Yorkers celebrated anyway by going on annual journeys of their own—and finding new homes for themselves. As decades passed, the tradition became law.

But by the 20th century, Moving Day started to fizzle. Rent laws relaxed, and more tenants decided to renew their leases each year. Still, the custom didn't die until GIs returned home from World War II. The city's population soared, and the housing stock, already suffering, cratered. By 1945, nobody wanted to move. So they didn't. A similar tradition, however, still lives on—in Quebec. –LUCAS REILLY

ILLUSTRATION BY RYAN INZANA

→ THE BOTTOM LINE: BEFORE 1876, GRANDFATHER CLOCKS WERE CALLED *LONGCASE CLOCKS*. HENRY CLAY WORK'S SONG "GRAND-

PRESIDENTIAL SEATING

Every head of state builds a Cabinet. But did you know they're also fond of designing chairs?

SPIN DOCTOR
Unless you're a carny, the swivel chair is probably the closest thing your office has to a carousel. Thomas Jefferson invented it in 1775 after taking a wooden English-style Windsor chair and adding rollers from window sash pulleys to make a spinning seat. Jefferson even sat in the prototype while drafting the Declaration of Independence. It wasn't his only foray into making furniture, either. He also created a walking stick that folded into a seat and a revolving bookstand that displayed five open books at once.

BLIZZARD WIZARD
William McKinley refused to travel during his presidential campaign. He thought that if people wanted to hear his ideas, they should visit his home in Canton, Ohio. Weirdly, this worked. McKinley's "Front Porch Campaign" drew 750,000 attendees, and he won the race by barely leaving his stoop. So it's no surprise he knew a thing about comfy seats. When he wanted a special Morris chair installed in the White House, he designed it "by having persons of varying size sit in snowbanks, then transferring the curves left by the impression of the bodies onto the drawing board," writes Frank Ransom in his book *The City Built on Wood*.

ROCK AND ROLL
What Jackie Kennedy did for fashion, her husband did for rocking chairs. JFK had such a bad back that, in 1955, a doctor prescribed the future prez one-on-one time with a rocker. Kennedy was so fond of the chairs that he brought them on Air Force One and to Camp David, even gifting some to his valet and heads of state. By 1963, the rocking chair was so popular that toymaker Pascal Kamar made a JFK doll that sat in a rocker and played "Happy Days Are Here Again." Sales broke $1 million.

ALAMY (PEW)

PAY-PER-PEW

Church was the StubHub of the 19th century.

BEFORE THE 16TH CENTURY, most churches didn't have seats. Believers had to stand or bring their own stools. But by the early 1800s, clergy capitalized on a brilliant idea—charge people for their pews. The practice faded by the 1930s, but some British parishes were still letting pews as late as 1970. Here's how you could get the best seats in the house.

1 **PLAN AHEAD**
Although popularized in the 19th century, pew renting wasn't an entirely new idea. In 1621, parishioner (and winner of our coveted *History's Worst Husband Award*) Thomas Wiman paid about six shillings to reserve a stool "for the use of his wife" or the "woman that shall succeed her."

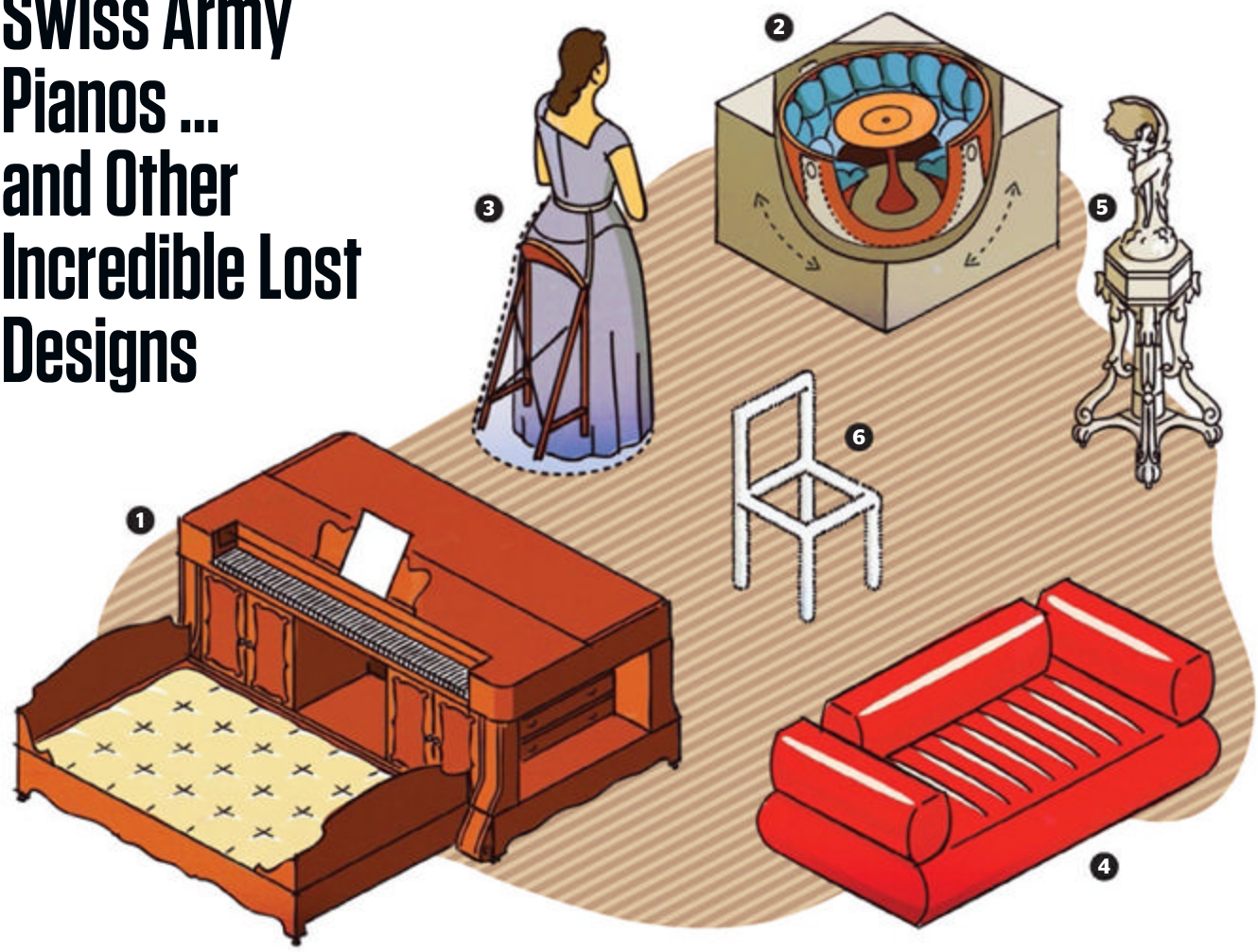
2 **DO YOUR BIDDING**
The best seats went to the highest bidder, while nonrenters were relegated to unassigned benches, stools, and pews in the back. If renters caught strangers in their personal pew, they reserved the right to kick the intruders out.

3 **GET A SECOND MORTGAGE**
Mark Twain once complained that seats in New York's parishes went for as "high as house rent." He wasn't kidding. In 1861, the best pew in Brooklyn's Plymouth Church rented for $160 a year. That's $2,500 in today's money! By 1908, one church in New York made $55,000 off its pew roll.

Loveseats were not designed for two people, but built for 17th-century ladies' dresses.

FATHER'S CLOCK" REBRANDED THE TOWERING TIMEPIECE. → AL CAPONE'S BUSINESS CARD SAID HE WAS A USED FURNITURE SALESMAN.

Swiss Army Pianos ... and Other Incredible Lost Designs



1) THE SWISS ARMY PIANO
In 1866, Charles Hess designed a piano containing a trundle bed, two closets, a four-drawer bureau, and a sewing area. Hess designed it for hotels and boarding schools, where bedrooms could also be used as daytime parlors. The piano could hold bedclothes, a washbowl, a pitcher, and towels. Meanwhile, the stool doubled as a writing desk and contained a mirror. Lower cabinets held a "lady's work-box," complete with needles and a pincushion. Procrastinating before your piano lessons has never been so easy.

2) THE WEEBLE-WOBBLE SOFA
As steamship travel became more popular and affordable in the mid-19th century, a nautical-minded inventor by the name of Newell proposed an "oscillating" couch that kept passengers level as the ship listed over the waves. Looking a lot like the hollowed-out shell of an oversized coconut, the teetering half-sphere was lined with plush cushions and came with its own fixed coffee table. Intended to prevent seasickness, unfortunately, the creation was probably just as likely to induce it.

3) THE WEARABLE STOOL
The popular Victorian bustle protruded from a woman's backside so far that it made sitting nearly impossible. On the plus side, it made it easy to stow something clunky underneath a lady's skirt. No wonder *Scientific American* helpfully proposed in 1887 that women should strap stools to their derrieres to prevent "the fatigue of long standing or walking." There's no evidence anybody actually tried to fashion the lifehack, however. After all, you try walking with a stool strapped to your behind.

4) THE INFLATABLE LOVE SEAT
The cheap inflatable accoutrements of a '90s girl's bedroom don't compare to Quasar Khanh's pioneering furniture from the late 1960s. The Vietnamese designer made everything from a plastic dress to a boxy transparent car, but he's best known for using air as a building material. His blow-up lounge chairs, which were made in a French beach toy factory, were intended for homes hoping to save space. Instead, they ended up in museums like the Victoria and Albert in London—but you may not sit on the art.

5) THE CONCRETE PHONOGRAPH
Thomas Edison believed that in the future, Main Street would be lined with concrete homes. Edison's cement houses—which his company could build in a single pour—were clean and "practically indestructible." And for an extra $200, he'd throw in some concrete furniture, from rock-hard chairs to cement phonograph cabinets. In 1911, Edison told *The New York Times* that concrete furniture was "more artistic and more durable than is now to be found in the most palatial residence in Paris or along the Rhine."

6) THE CHEMICAL CHAIR
Japanese artist Tokujin Yoshioka makes furniture that looks (but does not taste) like rock candy. His 2013 "Spider's Thread" chair was made by tying seven thin strings to a frame and hoisting it above a pool of mineral solution. Over time, crystals formed and clung to the strings, building a natural chair. It wasn't Yoshioka's first time growing crystal furniture. For his 2008 "Venus" chair, he grew a similar seat in a tank by dunking a spongy polyester substrate in a chemical bath. Chemistry has never been so comfortable.

ILLUSTRATION BY ARTHUR MOUNT

→ **THE BOTTOM LINE:** WILLIAM L. MURPHY INVENTED THE MURPHY BED IN 1900 BECAUSE IT WAS IMPROPER FOR A SINGLE LADY TO

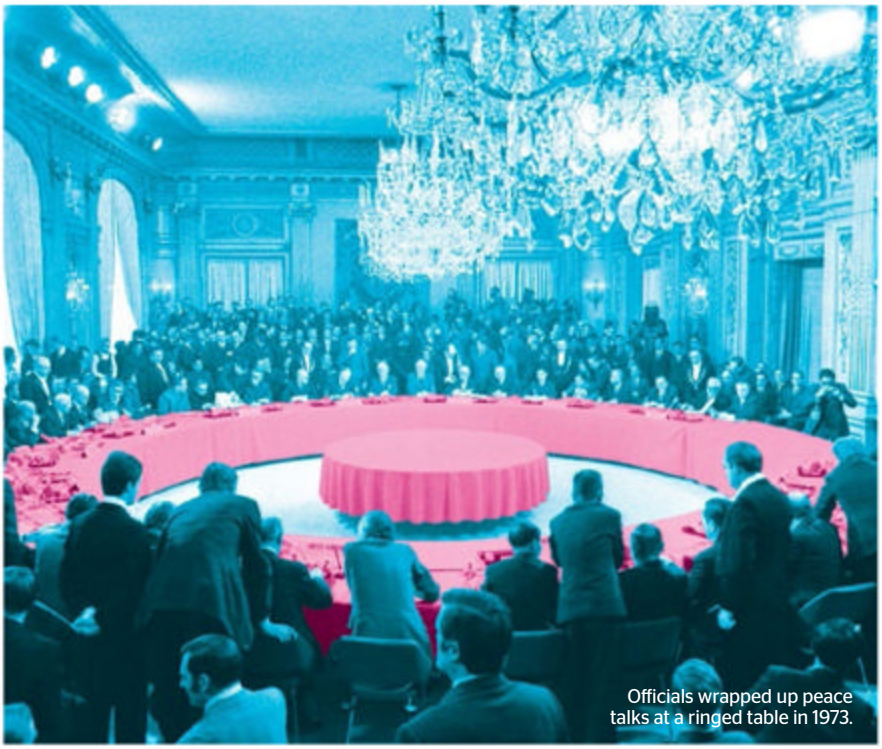
GREAT FURNITURE FINDS

Not everything in the junk drawer is worthless.

DARWIN'S LOST SLIDES
In 2012, paleontologist Howard Falcon-Lang opened up a dusty wooden cabinet at the British Geological Survey. Inside were 314 glass slides of fossilized plants, many owned by Charles Darwin. The slides had been lost for 165 years; Darwin had collected many of them while sailing aboard the *Beagle*.

A LIVE CAT
In March 2014, Crockett the cat crawled into a disassembled three-seat settee and got stuck. Nobody noticed, and the sofa—which was destined for a charity shop in Grays, England—was soon shipped to the store. The stowaway remained there for five days, and was rescued shortly after the couch's new owners heard their furniture meowing.

ROYAL WEDDING CAKE
On November 20, 1947, Queen Elizabeth II celebrated her marriage with a wedding fruitcake. Sixty-four years later, a charity worker found that there was still at least one slice left—she discovered a piece in a hospice filing cabinet. The boxed fruitcake was originally owned by C. H. Spackman, a Guard of Honour at the royal wedding. In 2013, Christie's sold it for $2,730, making it the most overpriced piece of fruitcake in history.



Officials wrapped up peace talks at a ringed table in 1973.

CORBIS (ROUND TABLE)

Nights of the Round Table

IN LATE 1968, the Vietnam War peace talks in Paris were stalled. The two sides weren't bickering over policy, nor were they quibbling over battle tactics. Instead, for 10 long weeks, leaders complained nonstop about the room's interior design. The big holdup? Nobody could agree on the shape of the negotiating table.

North Vietnam and the National Liberation Front—the Viet Cong—wanted a square table, since all four parties would appear equal. For that very reason, the U.S. and South Vietnam preferred a rectangular table. The table wasn't the only problem, either: Both sides argued over nameplates, seating, the speaking order, and the use of flags.

It's not as silly as it sounds. Furniture influences how people interact within a room, and, as environmental psychologists point out, external cues can steer our behavior. In fact, a 2004 Stanford study of "mundane objects" showed that just seeing a boardroom table makes people more competitive. The symbolism we perceive sways how we act.

The Soviets get the credit for ending the psychological standoff. On January 13, 1969, the Soviet Ambassador in Paris took a page out of King Arthur's handbook and suggested that both sides sit at a round table (adding two smaller rectangular tables around it). There'd be no flags or nameplates, and the speaking order would be random. Within a week, everyone agreed. After three months of gridlock, peace talks began.

The government term Cabinet *roots to the 16th-century French word* cabine, *which meant "small gambling room."*

ENTER A MAN'S BEDROOM. HE ONLY HAD A ONE-ROOM APARTMENT AND WANTED A GIRL HE WAS WOOING TO VISIT. (THEY LATER MARRIED.)

How to Launch a Lawn Chair

There's only a handful of pilots whose aircraft of choice is the humble garden-variety lawn chair. If you're looking to join their ranks, here are some tips for liftoff.

GET CERTIFIED
Unless you want to risk paying $5,500 in fines, step one is to register your lawn chair as an aircraft. You'll also need to become a certified "lighter-than-air" pilot with a free balloon class rating. When balloonist Joe Barbera and his self-described team of "redneck engineers" were trying to take a reclining beach chair into the clouds in 2013, he called the FAA for help. "They were pretty cool about it," he said on his Facebook page.

GRAB A CHAIR
People have soared in red armchairs, wicker chairs, and recliners. But the most famous lawn chair balloonist—Larry Walters, who floated up to 16,000 feet in 1982—strapped 42 weather balloons to a Sears lawn chair named "Inspiration I." Cheap. Practical. And most importantly, lightweight.

EMBRACE THE THIN AIR
Don't worry about packing a heavy lunch: Lawn chair ballooning may be the best weight-loss program there is. Extreme elevations are shown to decrease hunger. A 2010 study published in the journal *Obesity* found that sedentary men ate 730 fewer calories when staying at an elevation of 8,700 feet. Altitude may cause leptin (the hormone that keeps us feeling full) to spike.

BUY BIG BALLOONS
A party balloon can lift about 14 grams, or the weight of a couple of pennies. That means you'd need at least 32 party balloons to lift one pound, and about 6,400 balloons to lift a 200-pound person. So cluster balloonists use weather balloons. They can stretch 8 feet long and can hold about 291 cubic feet of helium—enough to lift 18 pounds. You can expect to spend about $400 on each balloon and its gas.

GET SCHOOLED IN HELIUM
Balloons float because helium is lighter than the air it displaces. In fact, a liter of helium weighs one gram less than a liter of nitrogen. That might not sound like much, but consider that nitrogen makes up 78 percent of the atmosphere. That's why some helium weather balloons can rise up to 18 miles.

PACK A PARKA
The temperature drops almost four degrees Fahrenheit for every 1,000 feet you climb, so a flight can get chilly. According to the U.S. Standard Atmosphere tables, if the temperature at sea level is 59°F, you can expect a frosty -12°F at 20,000 feet.

SHOOT FOR THE SKY
Dumping loads of liquid is the smoothest way to avoid a jerky start. In 2012, balloonist Kent Couch used 800 pounds of red Kool-Aid to make his flight seamless. As for the descent? Most people get down the old-fashioned way—with a BB or pellet gun.

ILLUSTRATION BY TEXTBOOK EXAMPLE

THE BOTTOM LINE: IN 2002, THE LOS ANGELES DRAMA CRITICS CIRCLE NOMINATED THE MUSICAL *FLIGHT OF THE LAWNCHAIR MAN*

A TIME TRAVELER'S GUIDE TO TABLE MANNERS

The next time you visit the past, follow these rules to avoid a dinner party faux pas.

ANCIENT GREECE

Napkins haven't been invented yet, so wipe your greasy hands with a piece of bread called *apomagdalia*. When you're finished, throw it—along with any other scraps—on the floor for the dogs.

Don't butter that roll! The Greeks considered consuming butter and milk barbaric. The poet Anaxandrides dissed the Thracians up north by calling them "butter-eaters."

BEDOUIN CAMPS

Before and after a meal, rub your hands in the sand outside your tent.

If bread falls to the floor, call the five-second rule: Pick it up, kiss it, raise it to your forehead. (The same practice applies in many other Arab cultures.)

After finishing coffee, shake the cup. If not, your host will just pour you more.

VIKING VILLAGES

The lady of the house should lay an embroidered white tablecloth before any feast.

As in modern France, loaves of bread can sit on the tablecloth.

Forks won't appear for centuries, so shovel your food down with a sharp knife.

When the drinking horn is passed, it's rude to decline unless you're old or sick.

MEDIEVAL EUROPE

Before carving into a piece of meat in France, take a moment and swear at it.

Erasmus of Rotterdam writes, "If it is possible to withdraw, [farting] should be done alone. But if not ... let a cough hide the sound."

Be polite! Toss chewed bones onto the floor. Just remember to look over your shoulder first.

ANCIENT ROME

Eat with your hands, but keep your pinkie and ring finger clean.

Don't excuse yourself to go to the restroom. Just use a chamber pot at the table.

It's rude to refuse food at a feast, so free up some room by shoving a feather down your throat to puke. (Seneca *hated* this, writing, "They vomit to eat and eat to vomit.")

1900s HUNGARY

Don't clink glasses! When Austria stopped the Hungarian Revolution of 1848, the Austrian army supposedly celebrated by bringing glasses together. Bitter Hungarians pledged not to clink drinks for another 150 years. Today, it's still impolite.

Drink from a shoe. Grooms celebrate nuptials by sipping a toast from his bride's wedding slipper.

ILLUSTRATION BY PINKY WEBER. ALAMY (FRANK LLOYD WRIGHT)

The Time Frank Lloyd Wright Got it all Wrong

WHEN FRANK LLOYD WRIGHT FINISHED the Wisconsin Johnson Wax Building in 1939, he also made some furniture for the office space—including special three-legged chairs for the secretaries. The seats supposedly encouraged good posture, but within weeks, administrators noticed a problem. An unusual number of secretaries were found lying on the floor. The chairs tipped over! At first, Wright—who once called sitting "an unfortunate necessity"—didn't see the problem. The proud architect figured the flaw would force everyone to sit straight. But he'd eat his words during a meeting. As the story goes, Wright plopped down in one of his sleek chairs and absentmindedly crossed his legs. The seat lurched and Wright tumbled onto the floor. In a rare moment of humility, he brushed himself off and agreed to add another leg to the chairs.

—NINA WINTERBOTTOM

In the 1960s, the first waterbed prototypes were filled with liquid cornstarch and Jell-O.

FOR BEST SCORE. → A 2012 STUDY FOUND THAT PEOPLE WHO SIT AT WOBBLY CHAIRS AND TABLES VALUE STABLE RELATIONSHIPS MORE.

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PHOTOGRAPHY BY JIMMY KATZ

HOW I GOT AMAZING

Vijay Iyer, Pianist

FROM MATH MAJOR TO JAZZ MAESTRO[1]

AS TOLD TO JEN DOLL

My parents asked me what instrument I wanted to play, and apparently I said violin. They signed me up for violin, and my sister for piano. Being a little brother, I had to go and mess with the piano. By the time I was in high school, I was playing keyboard in a rock band.

I had a few lessons with a local jazz pianist. He loaned me *Bright and Breezy* by Red Garland, who played with Miles Davis in the 1950s, and a Keith Jarrett Trio album. This was before Wikipedia, so I went to the library and started checking out other artists: Miles Davis, Herbie Hancock, Tony Williams, this young trumpet player named Wynton Marsalis. I listened to a lot of Prince, Michael Jackson, the Police—stuff that had artistry, musicianship in it.

And then I found Thelonious Monk. He doesn't sound like what people tell you jazz is supposed to sound like. He has a unique, strong identity. That hit me hard. It was more than just pretty music; it was like this person was talking to me. He's still my No. 1 influence of all time. His relationship to the piano is so personal. I grew up banging on the piano, figuring out my own relationship to it.

It never dawned on me that I had any shot at being an artist. Music has always been a big part of my life, but I never knew I could make it a profession. No one in our family had that as a point of reference. My parents are immigrants

[1] *Break Stuff*, from the Vijay Iyer Trio, is available now.

from India. To be an artist coming out of that world was a little unlikely.

At Yale I was a physics and math major. I had such weird interactions with the music department. It was so stuffy and Eurocentric—I felt alienated. I did my own thing musically. Then I applied to grad school in physics at UC Berkeley, and when I moved to Oakland, I became the house pianist at a jazz club. I was 20 or 21, and these guys were in their seventies. That was its own education.

I had been in grad school for a couple years and I hit a wall. I was so active musically that I was having trouble keeping a balance. Opportunities to make my own music started to open up. I toured internationally with Steve Coleman; he plucked me out of obscurity. I felt like, *This is not a joke anymore. This is who I am; I better take this seriously.* I decided to leave physics. That's when my parents were like, "Wait, what the hell is this? I didn't put him through an Ivy League education to become an artist!"

In classical Western music, there's this dichotomy between the composer and the performer. The performer is supposed to execute—you have to be a vessel for someone else's will. That's where the concept of mistakes comes from. It's a bit peculiar. If you look at music around the world, that's not really how it works.

When people talk about jazz, they point to mistakes as proof that someone is improvising. I don't think that's a useful way to think about it. Improvising leaves you vulnerable to doing something you didn't intend. But those moments that come up in the process, I don't think it makes sense to call them mistakes. There's a pianist named Alexander von Schlippenbach who said, "The only real mistakes in improvised music are missed opportunities."

I feel stuck all the time! What unsticks me is time. It's patience and it's needing to finish something. Performing is about making choices out of necessity. That's the truest version of you, for better or worse.

Music keeps you humble. There's always more to learn and do better. When I say better, I mean, what does it mean to make good music? Good music reaches people. The real learning process is learning how to communicate.

This interview has been condensed and edited.

The legend goes that NASA spent millions of dollars developing a pen that would write in space, while the Russians just used a pencil. This story was even on an episode of *The West Wing*. But it's not true.

AMAZING ARTIFACT OF THE MONTH

The Fisher Space Pen

WRITE LIKE AN ASTRONAUT WITH THIS MODERN MARVEL OF ENGINEERING.

ILLUSTRATIONS BY MARCO GORAN ROMANO. FISHER SPACE PEN COURTESY OF MANUFACTURER

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The Space Pen was invented by a guy named Paul C. Fisher, a pen expert. He'd also created the Universal Refill ink cartridge. When he invented what he called the Anti-Gravity Pen, He wasn't thinking about using it anywhere other than Earth. The pen uses a semisolid ink in a cartridge pressurized with nitrogen, so ink is only dispensed when the roller ball starts moving. That's why it can write in space, underwater, and upside down.

NASA adopted the pen for use in space in 1968, beginning with Apollo 7. But the pens didn't cost millions of dollars (it was more like $2.39 each). Since then, the pens have made some surprising appearances. In 1998, the pen was used on the Mir Space Station in partnership with QVC to become the first product actually sold from space. The pen's sleek aesthetic appeal earned it a place in the Museum of Modern Art's permanent collection, alongside the Eames chair and the original iPod. But to see where the space pen fits into the history of writing implements, see page 46.

—LUIS PAEZ-PUMAR

FOLLOWING SPREAD: ALAMY

SO, WHAT'S THE DEAL WITH...

Japanese Whisky?

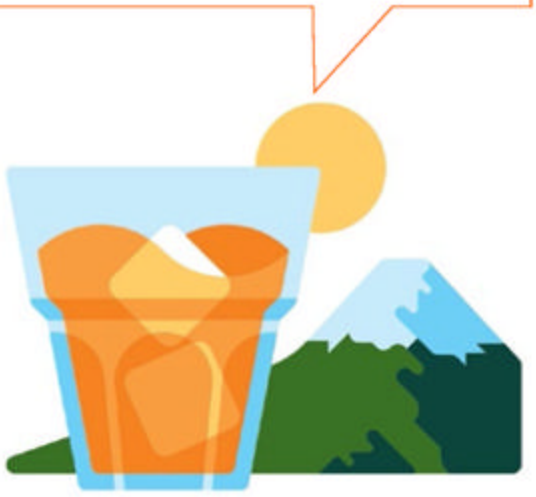
Short answer: It's whisky made in Japan!

Wait ... How did whisky ever land in Japan?
In 1918, a student named Masataka Taketsuru left for Glasgow University to study organic chemistry. But once he arrived, he fell in love with another kind of chemistry—distilling. When Taketsuru returned home, he helped start Japan's first whisky distillery, modeling it after everything he'd learned about scotch.

So what makes it different from scotch?
Technically, not much. Most Japanese distilleries are so committed to following Scottish standards that they go as far as to import their barley from the UK. While they don't stray from the formula, Japan's distillers "take time to make it correctly rather than making it quickly and cheaply," says spirit expert Nick Korn. The refined result is something whisky lovers appreciate.

What does it taste like? Whereas scotch can be blunt and peaty, a Japanese dram may have more floral notes. The liquid extracted from grain mash—called wort—is finely filtered, making a sipper that isn't as nutty. Japanese distilleries also use rare Mizunara oak for their barrels, which imparts a hint of coconut.

How should I drink it?
A "highball" in Japan is synonymous with a whisky soda. So mix away! But if you like drinking it neat, a great starter blend is Nikka's Taketsuru Pure Malt 12 Year, a blend that's fruity, smoky, and perfectly balanced. **—KYLE CHAKA**



HOW TO HACK ...

Your Credit Score

It's the mysterious number that determines how much someone can trust you with money. And a community of obsessives[1]—some of whom have gamed their scores as high as 850—know how to make it work for them. These are their tips.

CRACK THE CODE

Understanding your score's individual ingredients is crucial to jacking it up. Less important: Number of credit inquiries, number of accounts, credit history length. Fairly important: Missed payments and derogatory marks like bankruptcy. Critical: Your utilization rate. That is, the percentage of your credit limit you use every month.

PLAY THE REPORT DATES

Find out exactly when your credit cards or loans are reported. With that know-how, you can time your payments and control the optimum utilization rate. Keeping the rate low is essential, but having no debt isn't always best. In fact, people with a 1 to 10 percent utilization rate rack up, on average, 60 more points.

ASK FOR REPORTING

Not every one of your accounts may be reported to credit bureaus every month. But don't be afraid to ask to have them reported to creditors. If they are in good standing, they could potentially boost your number.

NEVER GET REJECTED

Whenever you apply for a new card, somebody has to check your credit. It's called a "credit pull" and it can dent your score. To ensure it's not for naught, check credit pull databases online to ensure you'll be accepted. You can compare your score to those that were denied.

—MARY PILON

[1]They gather online at sites like ficoforums.myfico.com and creditkarma.com to compare notes.

5 THINGS TO SEE WHEN YOU END UP IN ...

Abu Dhabi

CAMEL-RIDING ROBOTS, RAPTOR BEAUTY PAGEANTS, 27-LANE HIGHWAYS, AND SINGING SAND DUNES, FOR STARTERS.

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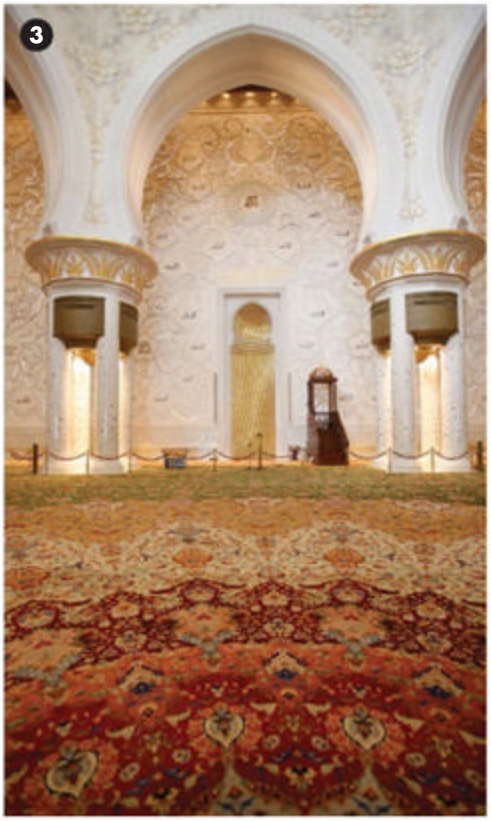

1. Yas Viceroy Hotel

The dazzling Yas Viceroy Hotel is coated in the world's largest LED lighting system—the glow makes Times Square dim in comparison. The hotel also happens to be built over an F1 racetrack, a fitting testament to Abu Dhabi's love affair with cars. The nearby Al Mafraq Bridge boasts an intimidating 27 lanes—and it'll take you past Ferrari World, the car manufacturer's first amusement park.

2. Robot Camel Jockeys

Camel racing is one of the Middle East's oldest sports, but it's changed a lot in the last decade. In 2002, children were banned from riding as camel jockeys—and replaced with robots. At Abu Dhabi's Al Wathba Camel Race Track, operators drive beside the camels to control the robots. At less than five pounds, these lightweight jockeys make for record-breaking races, yielding prize money in the hundreds of thousands. Winners can take their checks to the city's "gold to go" ATMs, which dispense bricks of real gold.

3. Sheikh Zayed Grand Mosque

The father of the United Arab Emirates, Sheikh Zayed bin Sultan Al Nahyan, built a mosque that bridges tradition and modernity. An attempt to "unite the world," it's made of materials sourced from all over the globe. It's also one of the world's largest mosques, capable of holding 40,000 worshippers. The bedazzled prayer hall is home to the world's largest hand-knotted carpet: 2.3 billion knots cover 60,000 square feet and weigh 35 tons. When you go, don't forget to pray for whoever vacuums it.

4. Singing Sand Dunes of Liwa

Some 30 destinations around the world claim to have singing sand, but none, experts say, have a sound as mellifluous as the giant dunes in the Empty Quarter of Abu Dhabi's southern desert. According to local legend, the deep roar—which sounds like a low-flying plane or the din of a didgeridoo—is caused by evil spirits whispering into the ears of disoriented travelers. Some scientists say it's caused by the vibrations of tumbling grains of sand.

5. Falcon Hospital

For centuries, Bedouin hunters relied on falcons to wrangle meals in the desert. Today, falconry remains one of the UAE's prized traditions. The country spends about $27 million protecting and conserving its wild birds. A lot of that money goes to this exclusive state-of-the-art veterinary clinic, which sees more than 11,000 falcons a year. Its prettier patients might even compete in Abu Dhabi's annual falcon beauty pageant.

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DRINK
A cappuccino decorated with gold flakes served at the Emirates Palace. (Tastier than Goldschläger!)

STAY
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101 MASTERPIECES #53 ***THE GREAT GATSBY***

Tug of War

F. SCOTT FITZGERALD'S GREAT AMERICAN NOVEL WAS A FLOP UNTIL IT WAS DEPLOYED OVERSEAS.

BY HANNAH KEYSER

ONE DAY IN 1937, F. Scott Fitzgerald stepped into a Los Angeles bookstore hoping to grab a copy of *The Great Gatsby*. Scouring the shelves, he couldn't find anything with his name on it. He stopped by another bookstore, and another. At each one, he ran into the same problem. His books weren't in stock. In fact, they hadn't been for years.

When *The Great Gatsby* was printed in 1925, critics roasted it resoundingly. "One finishes *Great Gatsby* with a feeling of regret, not for the fate of the people in the book but for Mr. Fitzgerald," wrote Harvey Eagleton of the *Dallas Morning News*. "F. Scott Fitzgerald's Latest a Dud," chimed the *New York World*. A critic from the *Brooklyn Daily Eagle* was more pointed. "Why [Fitzgerald] should be called an author, or why any of us should behave as if he were, has never been explained satisfactorily to me."

ILLUSTRATION BY CHRIS GASH

Readers agreed. *The Great Gatsby* sold a modest 20,870 copies—nothing like Fitzgerald's previous best sellers, *This Side of Paradise* and *The Beautiful and the Damned*. The literary lemon put the brakes on the author's extravagant lifestyle. As the decade wore on, his wife's mental health deteriorated, his marriage collapsed, and his drinking became a disease. Three years after that disappointing visit to the bookstore, he died of a heart attack at 44. "The promise of his brilliant career was never fulfilled," his *New York Times* obituary said. His funeral was rainy and poorly attended—just like Jay Gatsby's.

History forgot Fitzgerald while he was still alive, so why do we think of *The Great Gatsby* as the enduring classic of the Jazz Age? That story begins, and ends, with a world war.

FITZGERALD STARTED WRITING in 1917 because he thought his days were numbered. World War I was raging, and the Princeton dropout—now an Army infantry second lieutenant stationed at Fort Leavenworth in Kansas—was training to join it. "I had only three months to live," he recalled thinking, "and I had left no mark in the world."

So every Saturday, promptly at 1:00 p.m., he headed to the fort's officer's club, a noisy room clouded with cigarette smoke. There he sat alone at a table in the corner and wrote feverishly. In just three months, he had finished the draft of a 120,000-word novel called *The Romantic Egoist*.

The story was largely based on his own heartbreak. For two years, Fitzgerald, who'd grown up in the Midwest and was the son of a failed furniture salesman, had traded love letters with a rich Chicago debutante named Ginevra King. But on a fateful visit to King's estate, he reportedly heard her father say, "Poor boys shouldn't think of marrying rich girls." Soon after, the two broke up and King married a wealthier man. The experience scarred Fitzgerald, who became fixated on the social barriers—wealth and class—that had undermined what he thought was love.

He couldn't get the book published, and soon he was transferred to a new base in Alabama, where he met and fell for another rich girl: Zelda Sayre. They courted and got engaged. As soon as the war ended, Fitzgerald left for New York City.

There, he settled for a job writing advertising copy for $90 a month while trying to write more ambitiously in his spare time. "I wrote movies. I wrote song lyrics. I wrote complicated advertisement schemes, I wrote poems, I wrote sketches. I wrote jokes," he recalled in his essay "Who's Who—And Why." But all he had to show for it were the 122 rejection slips pinned to his wall. When Zelda learned how broke he was, she ended their engagement.

So Fitzgerald did what any rational twentysomething would do: He moved back in with his parents and tried writing a best-selling novel to win her back. Channeling both heartbreaks, he rewrote *The Romantic Egoist*. The finished product was *This Side of Paradise*. When Scribner's accepted the book, he begged for a quick release. "I have so many things dependent on its success," he wrote, "including of course a girl." When it debuted in March 1920, *This Side of Paradise* sold out in three days. A week later, Zelda married him. At 23, Fitzgerald was suddenly a celebrity. And he'd learned an important lesson: Art imitates life.

The Fitzgeralds once spent half an hour gleefully spinning in the revolving door of a hotel before being kicked out.

EVERY PERSON WAS A POTENTIAL CHARACTER, EVERY PLACE A SETTING.

THREE YEARS LATER, in the summer of 1923, Fitzgerald started planning his third book. He'd just written *The Beautiful and the Damned,* a story largely inspired by his relationship with Zelda, and it had been an instant hit. Now, he wanted to write a story set in the 19th-century Midwest. It would have heavy Catholic themes; the characters would include a young boy and a priest. But Fitzgerald needed money. He dismantled that draft, sold bits and pieces to magazines, and started mining life for new ideas.

He carried a notebook everywhere, recording things he observed and overheard. Everyone he met became a potential character, every place a potential setting. He drove friends mad by stopping them mid-sentence and asking them to repeat what they'd said. He saved letters and used them for ideas—especially old letters from Ginevra, which he kept in a folder labeled "Strictly Private and Personal Letters: Property of F. Scott Fitzgerald (Not Manuscript.)"

That stack of papers included a seven-page short story Ginevra had penned. It was about a wealthy woman who ditched an inattentive husband to rejoin an old flame, a self-made tycoon. If that sounds familiar, a similar plot became the central yarn of *The Great Gatsby*. That wasn't Ginevra's only influence on his work. Fitzgerald modeled practically every unobtainable upper-class female character after her, including Daisy Buchanan.

ALAMY

Daisy, like Ginevra, was a coy heartbreaker who turned down love to marry someone rich. When Gatsby reinvents himself as a rich man, she remains impossible to have—just as Ginevra was to Fitzgerald. But she wasn't his only muse; life with Zelda was just as inspiring. One of the most memorable lines in *Gatsby* came straight from her mouth: The day their daughter, Scottie, was born, Zelda, in a stupor, looked at her newborn and said, "I hope it's beautiful and a fool—a beautiful little fool." In the book, Daisy says nearly the same thing.

Despite all the material, writing was slow. Fitzgerald sat in an office above his garage, working on the book while also cranking out short stories to pay the bills. The Fitzgeralds were rich, but their spending habits were out of control. The American economy, after all, was soaring. When the U.S. left World War I, it became Europe's biggest creditor. People had more money than ever to spend on new amusements like dance halls and movie palaces. Lavish Long Island bashes and the lure of Manhattan speakeasies kept the Fitzgeralds distracted. The parties were wild. At one point, Fitzgerald even punched a plainclothes police officer. FITZGERALD KNOCKS OFFICER THIS SIDE OF PARADISE, screamed a newspaper headline.

In a way, though, he was always working. Fitzgerald's notes on New York's decadent party scene would become one of *Gatsby*'s pillars. Fitzgerald apologized to his editor, Max Perkins, for the shenanigans. But he blamed the delay in his manuscript firmly on literary ambition. "I cannot let it go out unless it has the very best I'm capable of in it," Fitzgerald told him. "The book will be a consciously artistic achievement."

Fitzgerald had a hunch that to write the Great American Novel, he'd have to leave America. So that summer, he packed up his family, along with a complete set of the Encyclopaedia Britannica, and sailed for the French Riviera. The trip afforded him the peace and quiet to finally commit *Gatsby* to paper. By September, the first draft was finished, and he was confident.[1] "I think my novel is the best American novel ever written," he wrote to Perkins.

Critics and fans weren't so sure. Nearly everybody praised Fitzgerald's lyrical style, but many, like Edith Wharton, didn't appreciate that Jay Gatsby's past was a mystery. Others complained that the characters were unlikeable. Isabel Paterson wrote in the *New York Herald Tribune*, "This is a book for the season only."

For two decades, it seemed like Paterson was right. The book vanished into obscurity, taking Fitzgerald and his once-decadent life with it. Then, five years after he died, something unexpected helped launch *Gatsby* to the top of America's literary canon—another war.

THE UNITED STATES had been at war for a year when a group of book lovers—authors, librarians, and publishers—had a brilliant idea. Wanting to promote titles that would maintain the country's morale, they founded the Council on Books in Wartime. Books, they argued, were "weapons in the war of ideas." In February 1943, they embarked on an ambitious effort: shipping titles to soldiers overseas. The concept was as simple as it was idealistic. While the Nazis were busy burning books, American soldiers would be reading them.

The program was perfectly timed. The latest innovation in publishing—paperbacks—had drastically reduced the cost of printing, and the first batch of Armed Services Edition (ASE) books were shipped to U.S. Army and Navy troops that July. Printed by magazine presses, the books were small enough to fit into fatigue pockets so they could be carried from the mess hall to the deck of a battleship to the trenches. A copy cost only six cents to make.

"Some of the publishers think that their business is going to be ruined," broadcaster H. V. Kaltenborn said of the program in 1944. "But I make this prediction. America's publishers have cooperated in an experiment that will for the first time make us a nation of book readers."

He was right. Bored and homesick, servicemen and women devoured the novels. One GI stationed in New Guinea said the books were "as popular as pin-up girls" and read until they fell apart. Sometimes, GIs tore out chapters so their friends could enjoy them at the same time. Before D-Day, commanders ensured that every soldier had a book before setting sail for Normandy.

"You can find boys reading as they've never read before," wrote one Army officer to the council. "Some toughies in my company have admitted without shame that they were reading their first book since they were in grammar school."

There were a lot of books to read: Altogether, the council distributed 123 million copies of 1,227 titles—*The Great Gatsby* among them. In 1944, only 120 copies of *Gatsby* sold. But the ASE would print 155,000. Free to soldiers, the books dwarfed two decades of sales.

Gatsby entered the war effort after Germany and Japan surrendered, but the timing was fortuitous: While waiting to go home, troops were more bored than ever. (Two years after the war ended, there were still 1.5 million people stationed overseas.) With that kind of audience, *Gatsby* reached readers beyond Fitzgerald's dreams. In fact, because soldiers passed the books around, each ASE copy was read about seven times. More than one million soldiers read Fitzgerald's Great American Novel.

"There is no way to determine how many converts to literature—or less elegantly, to reading—were made by the ASE. The fix was free," Matthew Bruccoli writes in *Books in Action: The Armed Services Editions*. "Moreover, it seems highly probable that some postwar reputations were stimulated by the introduction of authors in the ASE to readers who had never read them before."

For Fitzgerald, it was a great reawakening. The author's death in 1940 had rejuvenated academic interest in his work, and many of his literary friends were already trying to revive his name. But the military program sparked interest among a wider, more general readership. By 1961, *The Great Gatsby* was being printed expressly for high school classrooms. Today, nearly half a million copies sell each year.

These new converts—and the generations that would follow—saw in *Gatsby* something that Fitzgerald's contemporaries had dismissed as short-sighted. Now that the Roaring Twenties were nothing but an echo, the value of Fitzgerald's work became obvious. He had captured an era that was long gone, but still loomed large in the American psyche. Few people had written about the Jazz Age so colorfully, and few people had captured that feeling of longing for something you couldn't have. Fitzgerald did it all so well because he had lived it.

Perhaps that feeling of longing resonated with soldiers. Far from home, surrounded by the remnants of war, a book like *Gatsby* was a means to escape. It had the power to transport a reader back to a prosperous, hopeful world where the champagne flowed freely. Even now, nearly a century later, it still does.

[1] He couldn't decide on a title though, debating between several, including *Among the Ash Heaps and Millionaires*; *The High-Bouncing Lover*; and *Under the Red, White, and Blue*.

The Royal Armpits

AND OTHER REASONS WE SHOULD BE THANKFUL THEY DON'T MAKE HISTORY BOOKS SCRATCH 'N' SNIFF.

BY A.J. JACOBS

TYCHO BRAHE WAS ARGUABLY one of the luckiest men in history. The 16th-century astronomer famously lost his nose in a duel during an argument over a math equation. Which, admittedly, can't have been comfortable. On the other hand, Tycho wore a brass nose for the rest of his life, which meant he would have had more difficulty smelling. And that must have been a blessing, because the past was a putrid place.

The problem reached all the way to the top: There's a long history of foul-smelling royals. Queen Elizabeth I proudly declared that she took a bath[1] "once a month, whether she needed to or not." Her father, King Henry VIII, was even smellier. Later in life, the overweight monarch had a festering wound on his leg that you could smell from three rooms away. The lesion—which some say he got from wearing a too-tight garter—was made worse by the royal doctors. They believed the sore needed to run in order to heal, so they tied it open with string and sprinkled in gold pellets to keep it infected (and putrescent).

Over in France, Louis XIV was famous for his halitosis. (His mistress Madame de Montespan doused herself in heavy plumes of perfume to thwart the smell.) Meanwhile, his predecessor, Louis XIII, proclaimed, "I take after my father. I smell of armpits."

The problem, as Katherine Ashenburg explains in her book *The Dirt on Clean*, was that people believed water opened the pores and allowed dangerous diseases into the body. So baths—popular just centuries before—were avoided like the plague (which they did not, in fact, cause).

But the royal palaces were an olfactory paradise compared to what you could expect on history's roads. Here's how Catherine McNeur describes a typical 19th-century New York street in her book, *Taming Manhattan*: "Rotten food such as corn cobs, watermelon rinds, oyster shells, and fish heads joined with dead cats, dogs, rats, and pigs, as well as enormous piles of manure."

Lots of manure. A world of manure. Consider this: In 1900, New York had about 200,000 horses, which translated into at least five million pounds of poop each day. The mess was swept to the sides of the street like post-blizzard snow.

And let's not forget two-legged animals: Our forefathers sometimes tossed their business right out the window. Thousands of so-called "night soil men" had the job of carting waste to dumps on the edges of cities (one near London was given the delightfully ironic name "Mount Pleasant"). More efficiently, they'd sometimes just throw the mess in the river.

In the sweltering summer of 1858 in London, so much human excrement clogged the Thames that people started calling it "the Great Stink." At Parliament, the curtains were doused with chloride of lime to cover up the stench. It didn't work. Government offices shut down. Part of the problem came from the recently invented flush toilet, which created so much raw sewage it overflowed the river.

Then there was the smell of death. Butchers commonly killed and disemboweled animals in the streets. As King Edward III said in the 14th century, "By reason of killing great beasts, from whose putrefied blood running down the streets, and the bowels cast into the Thames, the air in the city is very much corrupted and infected." He tried to ban butchering in the center of London, but his law was often ignored. Human corpses also contributed: One British church stashed an appalling 12,000 of them in its cellar, according to Catharine Arnold's book *Necropolis*. (The minister "sold" burials but didn't actually bury anyone appropriately.) The fumes frequently made worshippers pass out.

BATHS WERE AVOIDED LIKE THE PLAGUE (WHICH THEY DID NOT, IN FACT, CAUSE).

But perhaps the most insidious stink was that of everyday life. Homes stank; the whale-oil lamps exuded a nasty fishy odor. Churches stank; St. Thomas Aquinas approved of incense because the flock's BO "can provoke disgust." Theaters stank; at Shakespeare's Globe, those who bought the cheap tickets were not-so-affectionately referred to as "penny stinkers."

So what was a person with a sensitive nose to do? One solution was the vinaigrette. Not the salad dressing, but a little Victorian perforated box filled with herbs and a vinegar-soaked sponge meant to be sniffed in times of olfactory distress. Alternately, you could cut off your nose.

[1] Contrary to the schoolhouse myth, baths were common until the plague started scaring everybody out of the tub. In early Irish households, it was rude not to offer guests a bath upon entering!

ILLUSTRATION BY LUC MELANSON

Why Do We Gesture When We Talk?

RESEARCHERS THINK OUR HANDS HAVE SOMETHING TO SAY.

BY ARIKA OKRENT

IN THE EARLY 1970S, David McNeill, a psychology professor at the University of Chicago, was giving a talk in a Paris lecture hall when something odd caught his eye. There was a woman in the back of the room moving her arms in a way that seemed to convey exactly what he was saying. It took him a moment to realize that she was speaking, too, and another to realize that she was an interpreter, translating his words into French. For McNeill, that moment of confusion sparked an insight that would lead to a lifetime of research: Gesture and speech are not as separate as they seem.

Gesture researchers have spent the past 40 years uncovering how movements (like a cupped hand rotating in space or a finger tracing a path through the air) are intimately tied to speech. Regardless of their spoken language or culture, humans gesture when they talk. They gesture even if they have never seen gestures before—people who have been blind since birth do it—and they gesture even if they're talking to someone on the phone and know no one can see them. When speech is disrupted—by stuttering, for example—so is gesture.

In fact, gesture is so tightly bound to language that differences between languages show up as subtle differences in gesture. Whether a language puts information on the verb ("He *flies* out" in English), or on a particle outside the verb ("He exits *flying*," in Spanish) will affect where the gesture for "flying" appears. In English, it will last only for the duration of the spoken verb: *flies*. But in Spanish, it will spread over the whole sentence, or even multiple sentences. In other words, the way you package your thoughts into speech is also how you package them into movement.

Researchers are especially interested in the times when gestures don't match speech. The mismatch can be a valuable window to what's going on in the mind. Susan Goldin-Meadow, another University of Chicago psychologist, has led a decades-long investigation of so-called speech-gesture mismatches. For example, until about 7 years of age, children don't understand that if you pour a tall glass of water into a shorter, wider glass, the amount of water stays the same. They think the shorter glass contains less water. When asked to explain their reasoning, some children will say, "This one is shorter," while gesturing that the glass is wider. That discrepancy shows they subconsciously grasp that both dimensions are important. Teachers who can spot these mismatches can tell when a student is ready to understand the relationship between height, width, and volume.

GESTURES DON'T JUST SHOW WHAT WE'RE THINKING—THEY ACTUALLY HELP US THINK.

When we speak, we put our thoughts into words, and when we gesture, we put our thoughts into our hands. But gestures don't just show what we're thinking—they actually help us think. Toddlers who are encouraged to gesture tend to start producing more words. Adults involved in various problem-solving tasks do better when they are encouraged to gesture. There is something about putting ideas into motions that brings us closer to grasping what we need to grasp. In a way, what really caught McNeill's attention in that Paris auditorium was a sideways glimpse, filtered through another language and another mind, of his very own thoughts.

ILLUSTRATION BY JOHN PATRICK THOMAS

7,000 people were watching when Cosmo Wright beat the *Zelda* record.

How to Play Video Games For a Living

COSMO WRIGHT CAN BEAT A VIDEO GAME FASTER THAN ANYONE. EVEN MORE AMAZING? HE TURNED THAT TALENT INTO A CAREER.

BY JEFF RUBIN

JEFF RUBIN[1]: You hold the world record for beating *The Legend of Zelda: Ocarina of Time* in the fastest time (18:10). How did you get into this game in the first place?
I was a big *Ocarina of Time* fan when it came out. I had it on the Nintendo 64, completed it, and ended up finding game FAQs where people talked about all these gameplay quirks, like, *Oh, here's this cool, funny thing you can do*. Later, all these people were trying to break the game in new ways. I remember thinking, *I love this game, I wonder how fast I can beat it?*

In gaming, that's called speedrunning. How would you describe speedrunning?
It's about pushing a game to its limit. It's possible to gain a lot of replay value by trying to go as fast as you can—it can really push the game in weird directions.

You can't defeat every single dungeon in *Zelda* in 18 minutes. You must have to exploit bugs and find ways around things you're supposed to do.
Absolutely. It's about mastering the game. Some speedruns are pure execution. But the *Ocarina* speedrun is focused on exploiting the game, abusing the code, and finding some way to get to the end superfast. It took me 1,269 attempts.

How does anyone find the glitches? Is it a matter of a million people playing for a billion hours and finding loopholes?
A lot of things are discovered by accident, but once they get documented, people figure out why they happen and where else

you can use them. Eventually you figure out exactly how the game is coded, and you analyze the game more.

If I did that I would just think, *Oh, weird*, and would never think about it again.
Nowadays people are actually looking for this stuff. And it can take years before things get found. Even the glitch that takes you to the end of *Ocarina* really fast, that took until 2012 to find, and we've been looking hard at the game since 2006.

So you had done it 1,268 times, but on 1,269, after you beat it, how did you feel?
I remember I sat through the credits and everyone was showering me with praise. I was like, thanks, everyone. Then I replayed the run, and I recognized some of the old-school people in my chat who had been around for years. I got really emotional. That run had such a low probability of occurring that I felt like I had looked into the abyss or something. People had been working on this for years, and now it had been solved. It changed me. It was such a powerful, emotional experience. I burst into tears.

I can't imagine the focus it takes to complete a successful speedrun, much less the fastest speedrun.
I was livestreaming that attempt, and I had my chat open and it was going ballistic. There were about 7,000 people in there typing a storm.

Can you imagine if you were in a large theatre? I'm trying to picture a room of 7,000 people watching you play *Zelda*...
It's kind of weird to think about it, but there were that many people watching. If you put it in terms of everyone in one room, it's amazing.

PEOPLE HAD BEEN WORKING ON THIS PROBLEM FOR YEARS, AND NOW IT HAD BEEN SOLVED.

On any given day you open up *Zelda*, you immediately have an audience, right? How many people are watching you?
Several thousand usually tune in for *Zelda*. It can be close to 10,000 if there's something exciting happening. Recently I've been playing this obscure Nintendo 64 game called *Beetle Adventure Racing*. Around 1,800 to 2,000 people tune in.

I noticed your speedrun is in Chinese. Why the Chinese version?
A couple years ago my friend Alec found a Chinese release of the game. It has low lag and fast text because you can express more in fewer words in Chinese. I figured I might as well speedrun on the fastest version I could get.

Is there a part of the run that is the most difficult to execute?
There's a thing near the end called the void warp. I have to roll into one of the falling rocks. I have to make it so the rock hits me during the part of my roll when I still have invulnerability, and I have to target and lock my shield at the same time. If I do that all right, I go shooting backward really fast.

And this is your full-time job.
Yeah. I have a decent following on Twitch, the biggest website for live gaming contests. We stream our live attempts and thousands of people come in, and they want to root for you and see you succeed. People can subscribe to the channel and that supports me. I have a YouTube channel that is decent as well, and there's also ad revenue.

What did your parents say when you told them this was what you were going to do?
I have a degree in graphic design, but video games were my whole life. After I graduated, I felt like I still wasn't as passionate about design as I was about video games. At one point I realized this was going to work out financially. It's a really big industry now. There are so many people making a living streaming.

Do you always have fun streaming?
If I'm not having a good time, I'm going to turn off the stream. Every time I stream it's because I want to be there, but that often leads to me playing other games.

Do you think someone can beat your record?
If someone did what I did, sit in an apartment for months and analyze the game in depth, I could see it being beaten by maybe five seconds.

All the slack in your run was just a few seconds?
Yeah. I don't think I could top it. My goal was 18:20, and I knew 18:20 would include some mistakes, but then I got 18:10 and I was like, *Wow*. At that point every second you improve is exponentially harder. It would be difficult to beat.

I want to hear more about the charity events that speedrunners do.
Speed Demos Archives started these marathons and it's been great. Speedrunners fly in and we all do a live event together. It's a week of nonstop speedruns. If you donate, your comments get read. There are donations, incentives, and a lot of cool challenges and races.

What charity does it raise money for?
Awesome Games Done Quick raises money for the Prevent Cancer Foundation. There's also one in the summer that raises money for Doctors Without Borders. The last AGDQ raised over a million dollars and the trend's probably not going to stop. So I wouldn't be surprised to see it over a million again.

You grew up with a Genesis. How old are you?
I'm 25.

And you don't worry that you'll get too old because video games are kind of a young person's game, as far as reflexes are concerned?
Gaming is now more part of our lives than it ever has been before, and it's probably going to be part of my life for longer than other people might do it. It's become this giant industry. I don't think I'm going to stop playing games.

[1] Host of *The Jeff Rubin Jeff Rubin Show* (jeffrubinjeffrubinshow.com); always plays as Jigglypuff.

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10 HIDDEN TALENTS

Octopuses[1] are complicated creatures: vulnerable, but strong; slimy,

BY **KATE HOROWITZ**
ILLUSTRATION BY **DANIEL DOWNEY**

1 THEY'RE THE ANIMAL KINGDOM'S BEST ESCAPE ARTISTS

Aside from its beak and braincase, an octopus is entirely squishy, meaning that a 100-pound giant Pacific octopus can squeeze through a hole about the size of a cherry tomato. They can also undo latches, untie knots, and open locks, all of which makes them extremely difficult to keep in captivity. In his 1973 book *Octopus and Squid: The Soft Intelligence,* Jacques Cousteau tells this charming story: "Our friend Gilpatric ... brought an octopus home and put it in an aquarium, which he then covered with a heavy lid. A short time later, the aquarium was empty, and Gilpatric found the octopus going through his library, book by book, turning the pages with its arms."

2 THEY'RE SCARY SMART — AND KEEP THEMSELVES BUSY

Given their love of libraries, it's no surprise that octopuses are the smartest invertebrates. They can solve puzzles, recognize human faces, navigate mazes, and even open childproof Tylenol bottles. In the 1990s, biologist Roland Anderson gave plastic pill bottles to the octopuses in his lab. Once they learned the bottles weren't edible, all of the octopuses lost interest—except for one. A female octopus used her funnel[2] to push the bottle to the opposite end of her tank. The water current pushed it back, and again, she pushed the bottle away. After repeating the move 18 times, Anderson had no doubt: The octopus was playing a game of bouncy ball.

3 THEY BUILD AWESOME FORTS

Since they move around to find prey, an octopus must find a new home every few days. The ideal pad is hidden, dark, and just a little larger than the octopus's body, so octopuses will often hide in the crevice of a rock, an old seashell, the hull of a shipwreck, or a stubby brown bottle. ("If you're determined to litter at sea but still want to keep the little octopus in mind, I suppose Red Stripe bottles might be the way to go," writes Katherine Harmon Courage in her book, *Octopus!*) Once the octopus selects a house, it uses its funnel to blow debris out of the den, and then barricades the entrance with rocks to keep out unwanted visitors.

4 THEY'RE SKILLED DECORATORS

Octopuses are careful housekeepers and spend time each day cleaning the sand, gravel, and the remains of last night's dinner from their house. Divers have learned to spot octopus dens by looking for a trash pile just outside the entrance. Female octopuses are also skilled interior decorators: They lay their eggs in long strings and attach them to the ceiling like translucent beaded curtains.

5 THEY CAN WALK ON DRY LAND

Some shallow-water species occasionally come ashore to hunt. Some have even been caught eating seagulls. But walking is just the beginning: To the chagrin of some scientists, these cephalopods can *run*. As a pre-veterinary student, Alexa Warburton had the tricky task of scooping octopuses out of their tanks. The stubborn animals would hide or squeeze into the tank's cracks to avoid being removed. As a last-ditch effort, some octopuses would trampoline off

OF THE OCTOPUS

but also kitten-like. And they're full of remarkable secret powers.

the net, leap to the floor, and take off zigzagging around the lab. It's "like chasing a cat," Warburton told *Orion* magazine.

6 THEY CAN VANISH INTO THIN WATER...

In less than 0.3 seconds, octopuses can change their color, texture, and shape to blend in with their surroundings—transforming their skin to mimic algae-covered rocks, a sandy seabed, or fronds of kelp. (Special cells let them display different pigments, while bumps on their skin called papillae can create textures.) It's astonishing, considering that scientists believe octopuses are colorblind. But that's just the first act: If a predator still isn't fooled, some species can deploy a pseudomorph—a life-size self-portrait made from a cloud of ink and mucus. The specter distracts and irritates the predator and allows the octopus to jet away.

7 ...AND THEY DO GREAT IMPRESSIONS

The mimic octopus, a smaller species that lives in the Indo-Pacific, uses its shape-shifting skills for a mind-boggling defense. Instead of convincing would-be predators that it has disappeared, *T. mimicus* instantly changes shape to look and act like venomous creatures, including flatfish, spiky lionfish, jellyfish, and sea snakes.

8 A SHARK IS NO MATCH FOR THEM

Concerned for the octopus's safety, Seattle Aquarium staff were hesitant to house dogfish sharks and a giant Pacific octopus in the same tank in 2001. They did it anyway, and for a while, everything seemed calm. Then partially eaten sharks began turning up on the tank's floor. A video camera captured the perpetrator—the octopus—following unhealthy sharks around the tank, grabbing them, and chowing down. Octopuses will also rip the stinging tentacles off a Portuguese man-o'-war and wield them like a weapon.

9 THEY'RE INNOVATIVE FOODIES

Deep inside its rubbery mantle, an octopus has a sharp beak and a toothed, tongue-like ribbon called a radula. When its super-strong arms aren't enough to pry apart a tasty clam's shell, the octopus uses its radula to drill a small hole in the shell, then injects a neurotoxin into the opening. The clam goes limp, the shell opens, and lunch is served.

10 THEY GET CREATIVE IN THE BEDROOM

The couch potato of the sea, octopuses will go to great lengths to avoid leaving the house. Fortunately, the male's sex organ is at the end of one arm, so mating doesn't have to be intimate. While some opt for the traditional mounted technique, others prefer what scientists call the "distance position." Male and female *Abdopus aculeatus* adults will even find houses near one another so that the male only has to stretch his hectocotylus—or sex arm—out his front door and into the female's house. Everybody stays safe indoors, and nobody has to buy dinner.

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[1] It's true! The most acceptable English plural is *octopuses*, not *octopi*. The classic Latin plural—which adds the *i*—is great for Latin-based words. Problem is, octopus isn't Latin! It's Greek. *Octopodes*, the Greek form, is also acceptable but a little archaic.

[2] The funnel is nature's great jet propulsion system, helping some octopuses dart through the water at 25 mph.

The Greatest Math Scandal in History

How a dangerous geometry secret brought down an ancient brotherhood.

BY **LUCAS REILLY** • ILLUSTRATION BY **BRIAN TAYLOR**

Around 530 BCE, a wandering Greek scholar named Pythagoras settled down in Croton, Italy, and started his own society. The group—called the Pythagoreans—had some strange rules. You couldn't eat beans, touch white roosters, or "urinate turning toward the sun." More sensibly, the clan was open to women and treated everybody equally. Above all, they adored numbers.

Being a Pythagorean was like spending life at a math-based religious summer camp. The mystical group worshipped numbers as gods. After all, numbers were eternal and unchanging, just like deities. Math, they believed, had the power to explain the world. There was just one problem: They only had whole numbers to work with. They had no concept of fractions.

About 30 years later, a humble triangle shattered their worldview. The Pythagoreans, who by now knew their famous theorem ($a^2 + b^2 = c^2$), couldn't find a whole number to express the hypotenuse of a right isosceles triangle: $\sqrt{2}$. The square root of two appeared to be irrational. Usually, they'd just explain the number with a ratio—something like 3:2 or 13:17. But that didn't work. The number was so baffling, they called it *alogon*: unspeakable.

Everybody who knew about it was allegedly sworn to secrecy. But when Hippasus of Metapontum discovered the dangerous root and threatened to share, the brotherhood flung him into the ocean.[1] The number "was the darkest secret of the Pythagoreans," writes Peter Pesic in *Abel's Proof*, "its disclosure their greatest scandal." But the group transcended trianglegate to make a heavy influence on Plato and Aristotle.

[1] This story is probably a metaphor. It's more likely that Hippasus "drowned" in a sea of infinite decimal places.

The Real People Behind 9 Characters You *Thought* Were Fictional

1) SEVERUS SNAPE
Harry Potter's antagonistic, unkempt, and ultimately loyal potions master was inspired by J.K. Rowling's severe high school chemistry teacher, John Nettleship. "I knew I was a strict teacher," he told a reporter, "but I didn't think I was that bad."

2) WONDER WOMAN
Psychologist William Moulton Marston was a man of many talents: He invented an early lie detector test. He also debuted Wonder Woman in 1941 to teach children about women's equality in an easy-to-digest format. His inspiration was a member of his family, Planned Parenthood founder Margaret Sanger.

3) UNCLE BEN
Betty Crocker and Aunt Jemima are fictitious, but Uncle Ben was a real Houston rice farmer renowned for his quality grains. However, that's not his rice in the box—nor is that his visage. The bow-tied man is said to be a Chicago maître d'hôtel named Frank Brown.

4) ZORRO
Zorro was likely based on the Mexican bandit Joaquin. Few facts exist about his life. Some say angry American miners raped his wife. Others say he was unfairly taxed for being Mexican. Regardless, something inspired Murrieta to form a band of hell-raising desperadoes, and it made him a frontier legend.

5) THE GIRL FROM IPANEMA
In 1962, a 17-year-old Heloísa Pinheiro walked by a seaside bar, caught the eye of songwriters Antonio Carlos Jobim and Vinícius de Moraes, and inspired a bossa nova masterpiece. When Jobim later met his tall, tan, young, and lovely muse, he proposed to her. She declined.

6) CHEF BOYARDEE
Before becoming the head on ravioli cans, Ettore Boiardi was the head chef at New York City's Plaza Hotel. In 1924, he opened a restaurant in Cleveland and began selling pasta sauce on the side. Four years later, he founded Chef Boyardee (changing the spelling so people would pronounce it correctly).

7) JESSICA RABBIT
Pin-up model Vikki Dougan—nicknamed "The Back" for her trademark low (and we mean *low*) backless dresses—never made it big in Hollywood, but her wardrobe (or lack thereof) was immortalized by the cartoon bombshell in *Who Framed Roger Rabbit*.

8) DON DRAPER
Mad Men's protagonist got his name and look from Draper Daniels, the creative director who helped invent the Marlboro Man at Chicago ad company Leo Burnett. Daniels, however, was a one-woman guy. Like a true ad man, he proposed to Myra Janco by giving her a business card stating his best qualities.

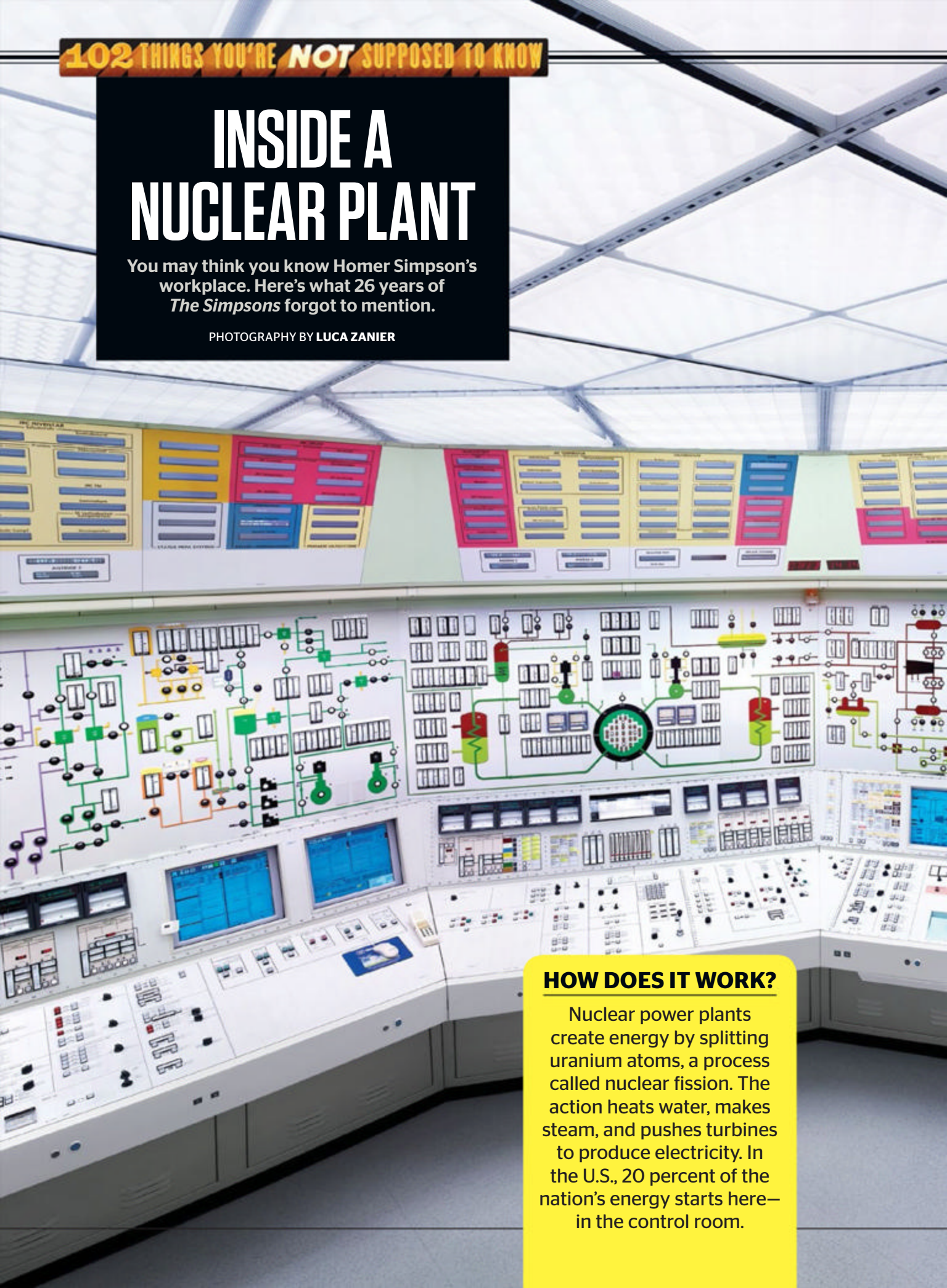
9) COSMO KRAMER
When Larry David and Jerry Seinfeld sat down to write a sitcom, they realized the man living across the hall from David was a ready-made character. Kenny Kramer is a former comedian who loves golf, cigars, and hot tubs. He has no regular job, is an ordained minister, and once ran for New York City mayor.

FRANK OCKENFELS 3/AMC (DON DRAPER). WARNER BROS. (SNAPE). ALAMY (WONDER WOMAN, ZORRO, IPANEMA, JESSICA RABBIT, KRAMER)

INSIDE A NUCLEAR PLANT

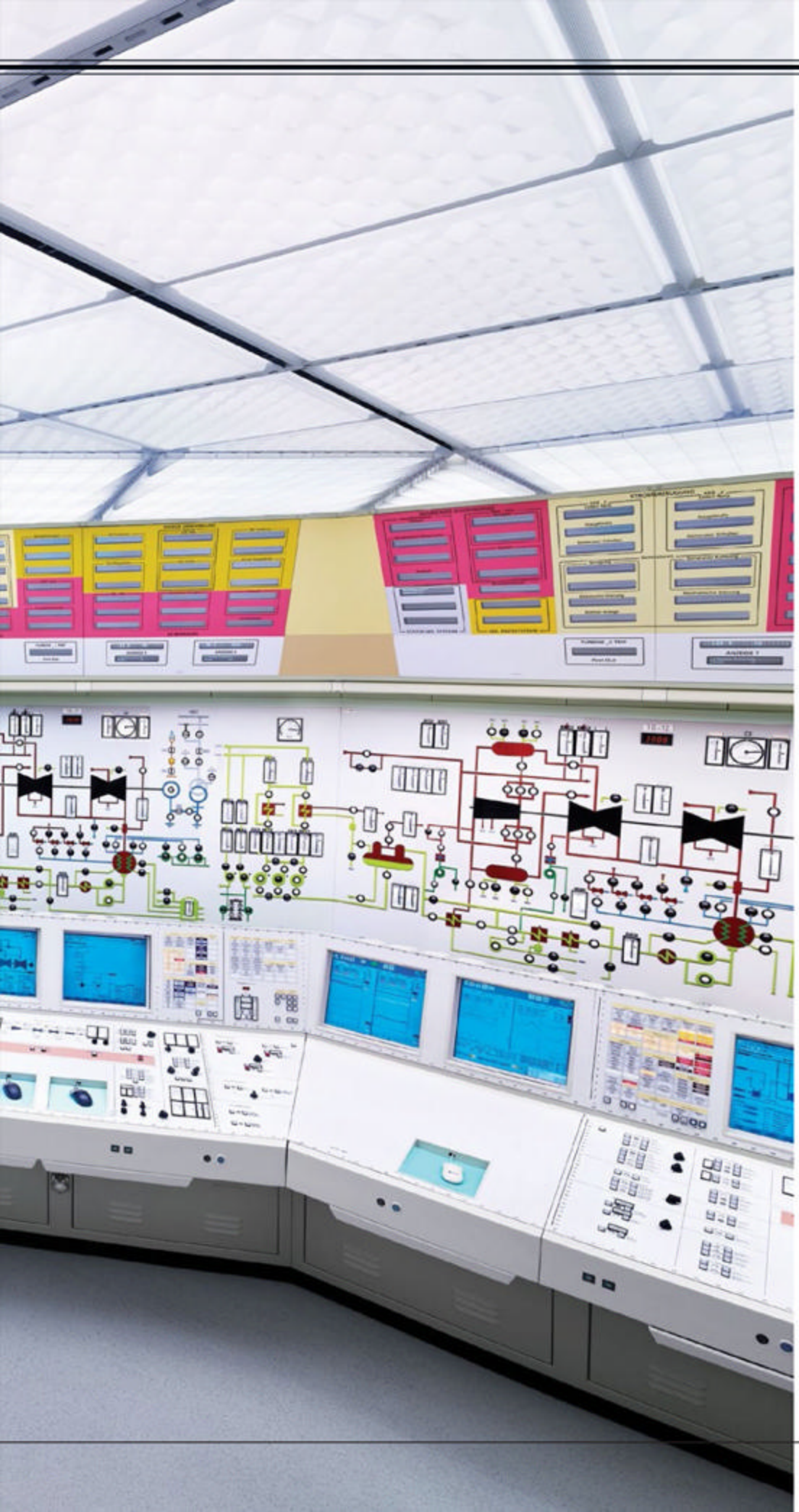
You may think you know Homer Simpson's workplace. Here's what 26 years of *The Simpsons* forgot to mention.

PHOTOGRAPHY BY **LUCA ZANIER**



HOW DOES IT WORK?

Nuclear power plants create energy by splitting uranium atoms, a process called nuclear fission. The action heats water, makes steam, and pushes turbines to produce electricity. In the U.S., 20 percent of the nation's energy starts here—in the control room.



Training is rigorous. Every nuclear plant in the U.S. maintains a replica of its own unique control room. Operators spend several months training (and re-training), often as much as 16 hours a day for up to two years.

Before entering a nuclear plant, workers pass through metal and explosives detectors and undergo biometric screening to confirm height, weight, and other physical characteristics. Before leaving, they are tested for radiation in full-body monitors.

URANIUM
92
U
238.03

Nuclear reactor operators work in a windowless bunker with special lighting to prevent shadows. That's because shadows on monitors can cause false readings.

The red shutdown button is real! In case of an emergency, to manually shut down a reactor, one can push a big button, often labeled SCRAM. (As the story goes, this once stood for *safety control rod axe man*, a guy designated to disable the reactor with an axe.) Once the button is pushed, the reactor ceases to operate almost instantly.

Nuclear energy has applications beyond power plants. The *Curiosity* rover exploring Mars is powered by a nuclear generator that harnesses heat from decaying radioactive material. Thanks to its nuclear battery, *Curiosity*'s two-year mission, which began in 2012, has been extended indefinitely.

The Secret Origin of 7 Extremely Important Actions

From high fives to air quotes, these smooth moves had to start somewhere.

BY **JULIE WINTERBOTTOM** • ILLUSTRATION BY **BRIAN TAYLOR**

1 THE FIST BUMP

The fist bump received its 15 minutes of fame most recently when President Barack Obama knocked knuckles with wife Michelle after clinching the 2008 Democratic nomination. Some credit the move to baseball Hall of Famer and apparent germaphobe Stan Musial, who bumped fists instead of shaking hands to avoid catching colds. But it's more likely that the gesture took off during the Vietnam War, where it was one of a number of "dap" greetings—stylized handshakes—popularized by African American soldiers.

2 AIR GUITAR

In 1957, a dozen years before Joe Cocker established himself as a virtuoso on the invisible instrument, Bill Reed of the Canadian vocal group the Diamonds performed a short but suave air guitar solo halfway through the group's rendition of Buddy Holly's "Words of Love." Today, some 10,000 people attend the Air Guitar World Championships in Finland.

3 PULLING A RABBIT OUT OF A HAT

Billed as "the King's Conjurer," Louis Comte was Louis XVIII's personal magician.

He also performed throughout Paris, and, as top hats became more fashionable, he began borrowing people's lids to conjure up various objects—including rabbits. It took until the 1840s for Scottish magician John Henry Anderson—"the Great Wizard of the North"—to popularize the trick.

4 THE HIGH FIVE

The high five's origin is contested, but it certainly got a boost in 1977 from Glenn Burke, the charismatic rookie outfielder for the Los Angeles Dodgers. When teammate Dusty Baker hit his 30th home run on the last game of the regular season, Burke couldn't contain his excitement. As Baker crossed home plate, Burke excitedly threw his arm in the air. Not knowing what to do, Baker lifted his arm, too. They slapped palms, and the move swept the clubhouse.

5 AIR QUOTES

The first person to make history by punctuating with her hands, as noted in the Oxford English Dictionary, was described by a writer in the July 1927 edition of *Science:* "Some years ago I knew a very intelligent young woman who used to inform us that her 'bright sayings' were not original by raising both hands above her head with the first and second fingers pointing upward. Her fingers were her 'quotation marks' and were very easily understood."

6 THE WHEELIE

Daniel Canary bought his first penny-farthing bike while working as a telegraph messenger and quickly became a local celebrity. In 1884, he rode down the steps of the U.S. Capitol building to great fanfare. In 1890, Canary tackled the "safety bike"—a new model we now just call the bicycle—popping a wheelie at Niagara Falls. As the *Chicago Tribune* reported: "Mr. Canary believes he was the first rider to perform the feat ... then regarded as impossible, of riding on the rear wheel, with the front wheel elevated."

7 THE SELFIE

Just months after Louis Daguerre announced his invention to the French Academy of Sciences in early 1839, a young Robert Cornelius set up a camera fitted with an opera glass in the backyard of his family's Philadelphia store. He pointed the lens of the newfangled camera at himself and waited ... and waited. (Exposures for early cameras took up to 15 minutes.) He'd have to wait about 170 years for someone to finally invent an explanatory hashtag.

ALAMY (PORTMAN)

TOP 6 SECRET DOUBLE LIVES

Further reason to show these celebs some respect

Ina Garten: Nuclear Energy Guru

Before she became the Barefoot Contessa, Garten was an aide in the U.S. Office of Management and Budget. The future celebrity chef was a budget analyst, writing policy papers for Gerald Ford and Jimmy Carter's nuclear centrifuge plants.

Tony Blair: Band Promoter

At first, Tony Blair didn't want to be prime minister, he wanted to be the Don King of rock & roll. As a teen, Blair worked as a band promoter, manager, and chauffeur. At Oxford, he did Mick Jagger impressions while playing in the band Ugly Rumours—appropriate for a future politico.

Mae Jemison: Dancer

Before becoming the first black woman to go to space in 1992, Jemison waffled between becoming a doctor or a professional dancer. While studying medicine at Cornell, she took lessons at the Alvin Ailey School—and even choreographed her own shows.

Alexander Graham Bell: Pop Science Journalist

In the 1890s, Alexander Graham Bell started writing articles under the assumed name H.A. Largelamb for "the fun of seeing if he [could] make another reputation for himself." Three were published in *National Geographic* before his secret leaked.

Natalie Portman: Science Whiz

While at Harvard, Portman co-authored a paper titled "Frontal Lobe Activation During Object Permanence: Data from Near-infrared Spectroscopy." It wasn't her first rodeo. In high school, she joined two scientists to publish "A Simple Method to Demonstrate the Enzymatic Production of Hydrogen from Sugar" in the *Journal of Chemical Education*.

Tim Duncan: Dork Ambassador

Tim Duncan is a wizard on the court—and possibly off it. The five-time NBA champion is an unabashed nerd who reportedly loves attending Renaissance fairs, has tattoos of Merlin and a skeleton jester, collects swords and knives, and—yes—even plays *Dungeons and Dragons*.

THE TRUTH ABOUT ICEBERGS

Only 10 percent of an iceberg sits above the waterline—the rest is below the surface. And that's where it gets interesting.

PHOTOGRAPHY BY **ALEX CORNELL**

WHAT LIES BENEATH?

Most icebergs are white because they're caked with snow and full of air bubbles. Over hundreds to thousands of years, the ice gets so tightly compressed that the air bubbles are squeezed out. So when a hunk of ice flips over, like this one did, a snow-free jade blue 'berg comes to light.

When an iceberg is barreling toward an oil rig, tugboats carrying "iceberg wranglers" are often dispatched to lasso it with massive, 8-inch-thick ropes. Because the 'bergs are so heavy, it can take 10 hours for the boat to finally reach speeds of one knot.

When they bump against one another, icebergs can produce harmonic tremors that have been compared to buzzing beehives, neighing horses, and pinging submarines. That's not all! High-pressure water flowing through interior crevasses can sound like a string section warming up.

During World War II, British scientists concocted a top secret plan—endorsed by Winston Churchill—to use icebergs as aircraft carriers. In 1943, a model was built, but the project was later abandoned due to technical problems.

About 20,000 years ago, icebergs bobbed near the coast of Florida. As the Laurentide ice sheet covering Canada and the northern U.S. melted, hunks of ice 1,000 feet thick took a vacation down the East Coast to the Bahamas. Scientists found the scars on the seafloor last year.

In Canada, Quidi Vidi brewing company makes iceberg beer from 25,000-year-old bergs floating around Newfoundland. Another business makes vodka from the ice, while the Glace Rare Iceberg Water company sells melted ice for $15 a pop.

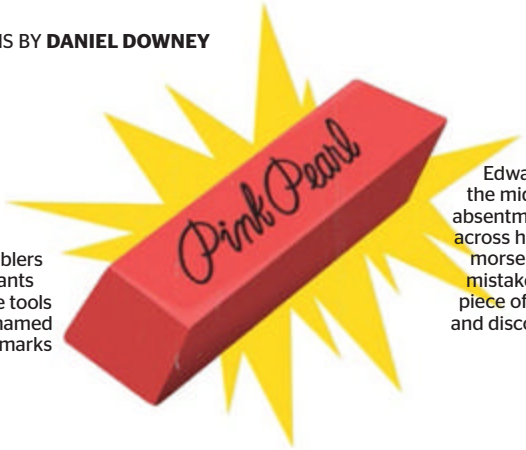
THE SECRET HISTORY OF THE PENCIL

(And why you should thank Henry David Thoreau for the No. 2.)

BY **BESS LOVEJOY** • ILLUSTRATIONS BY **DANIEL DOWNEY**

1325
Pencil—meaning "paintbrush"—enters the English language. By the 1680s, pencils are sometimes called "dry pencils" to distinguish them from ink pens and paintbrushes.

1612
London artists, students, and other scribblers take up "plumbago drawing," as merchants hawk pieces of graphite on the street. The tools don't come with erasers, though. One unnamed 1612 writer recommends rubbing out the marks with "crums of wheate bred."

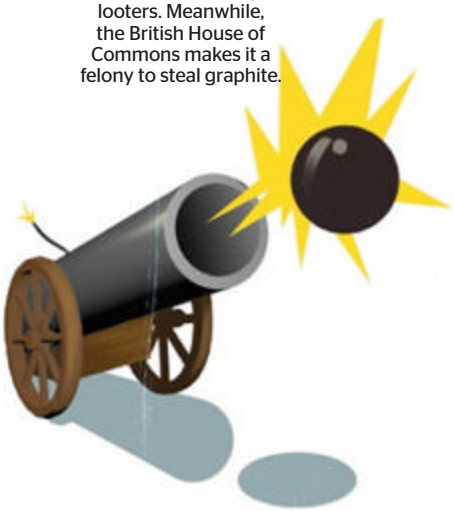


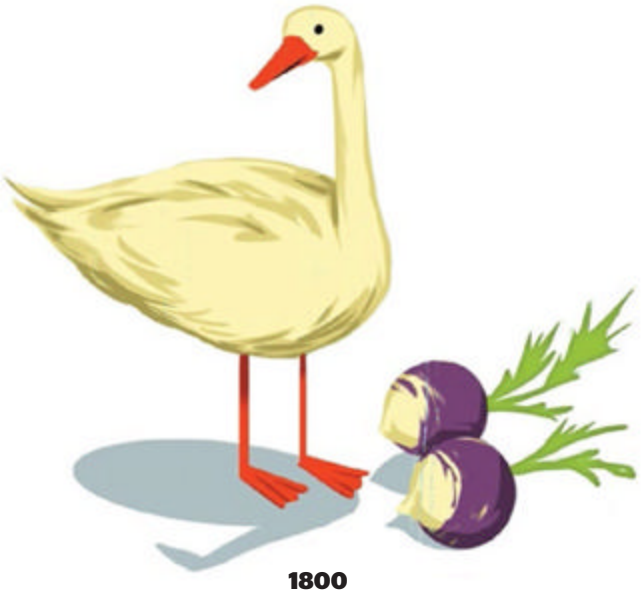
1770
Edward Nairne, in the middle of writing, absentmindedly reaches across his desk for a few morsels of bread. He mistakenly picks up a piece of rubber instead and discovers the rubber eraser.

1560s
Shepherds in Cumberland, England, find a tree upended by a storm and notice a strange black substance clinging to its roots—the first major graphite deposit. They use it to mark their sheep. It's presumed to be a kind of lead (it isn't!) and is dubbed plumbago, from the Latin for lead.

Late 17th century
Con artists called *stümplers* boost the fake pencil trade by blackening the tips of wooden sticks, making it look like there's graphite inside. Frustrated customers soon discover they've been duped into buying expensive kindling.

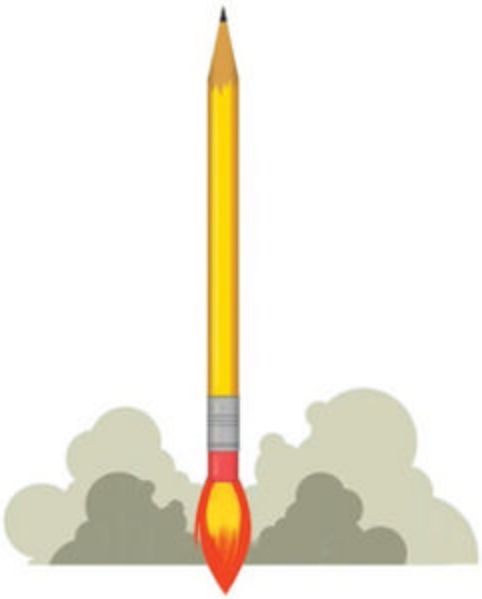
1752
Noticing that graphite helps munitions slide from their casts, the British start using it to make cannonballs. The substance is so valuable that Cumberland mines are flooded to stop looters. Meanwhile, the British House of Commons makes it a felony to steal graphite.





1800
With high-quality European graphite hard to come by, American writers improvise. Quill pencils are made by poking a goose feather into a turnip and pouring a melted bullet inside. A few years later, a Massachusetts schoolgirl creates America's first graphite pencil by stuffing English graphite and glue into a twig she hollowed out with a knitting needle.

1847
A Frenchman panning for gold in Siberia finds the world's richest seam of graphite. Pencils made with it become the finest around—sensitively called "Mongol" and "Mikado" to conjure images of East Asia. By 1890, manufacturers begin painting pencils yellow—the Chinese color of royalty—to symbolize quality.



1965
NASA retires the pencil upon learning it isn't safe in space—it's flammable and fine wood flakes can harm equipment. The agency orders 34 special mechanical pencils from Tycam Engineering, and pays $128.89 each. After a public outcry, the agency switches to the Fisher Space Pen (see its history on page 23!).

1795
Thanks to economic blockades, quality British pencils become rare in France. This spurs the French minister of war to ask Nicolas-Jacques Conté, an army officer and artist, to come up with a substitute. Conté reportedly solves the problem in eight days, mixing inferior French graphite with clay. The modern pencil is born.

1844
Before escaping to Walden Pond, Henry David Thoreau works for his family's pencil biz. One day, he adds clay binder to the graphite—rediscovering the French secret to perfect pencils. By mid-century, his family is selling pencils of varying degrees of hardness, which they classify with a new system: numbers.

1940s
During World War II, the British develop pencils with silk maps and tiny compasses hidden under the eraser. Invented by Charles Fraser-Smith—the inspiration for "Q" in the *James Bond* movies—the secret compasses help pilots navigate over enemy territory.

Honest Abe's Secret Passion

Lincoln was an animal welfare activist before the concept existed.

BY **MATTHEW ALGEO** • ILLUSTRATION BY **BRIAN TAYLOR**

A few days before his eighth birthday, in February 1817, Abraham Lincoln shot a wild turkey. He hoped the kill would impress his father. Instead, the sight of the dead bird left the future president traumatized. Lincoln later wrote that he never again pulled a trigger on "any larger game."

On the frontier, animals were seen as sources of labor, nourishment, or amusement. It was a time when ripping the heads off live geese was the entertainment equivalent of late-night TV. But Lincoln wasn't shy about sticking up for critters. As a youngster, he saved a turtle when some boys tried to pour hot coals on the animal's back; he also admonished his friends that "an ant's life was to it as sweet as ours to us."

The role animals played in Lincoln's life has been largely overlooked. But it's not an unimportant part of his legacy. As biographer Michael Burlingame writes, "Lincoln's outrage at the mistreatment of animals foreshadowed his indignation at the cruelties of slavery."

Lincoln's White House was a menagerie of cats, rabbits, goats, and ponies. And once, while visiting General Grant and his troops at City Point, Virginia, he noticed three kittens on the floor of a telegrapher's tent, "crawling about … and mewing pitifully." Hearing that the kittens' mother had died, Lincoln ordered an officer to see that the cats were cared for. Before leaving, he returned to play with them—three times.

But there was one animal he adored above all. Around 1855, Lincoln adopted a stray yellow mutt he named Fido (from *fidelis*, Latin for "faithful"). Fido lived up to his name, accompanying Lincoln everywhere. But after the election of 1860, Lincoln feared the trip to Washington would be too stressful, and left the dog behind with friends. He even left behind Fido's favorite horsehair sofa to keep him comfortable.

When the president died, Fido returned the love, standing guard as thousands of mourners filed through Lincoln's home to pay their respects.

Adapted with permission from *Abe & Fido: Lincoln's Love of Animals and the Touching Story of His Favorite Canine Companion* (Chicago Review Press).

5 Hidden Truths of Seemingly Self-Evident Jobs

CARTOGRAPHERS

To catch plagiarists, mapmakers occasionally invent false streets and phantom cities as traps. In 2009, the nonexistent village of Argleton popped up on Google Maps near Lancashire, England. Locals quickly began promoting Argleton "tourism" and selling T-shirts.

PROFESSIONAL ATHLETES

Several men in the pros have a grooming secret that defies stereotypes: pedicures. Athletes like Dwyane Wade spend a lot of time on their feet; a little pampering can actually help reduce the risk of injury. Plus, it feels good to treat yourself.

ASTRONAUTS

The U.S. left a few trinkets on the moon after six lunar landings in the '60s and '70s—including four "defecation collection devices." Fortunately, times have changed. Today's technology requires astronauts to hook up to a machine that sucks feces away and into a refuse bag immediately. The waste is then stored and disposed of on Earth.

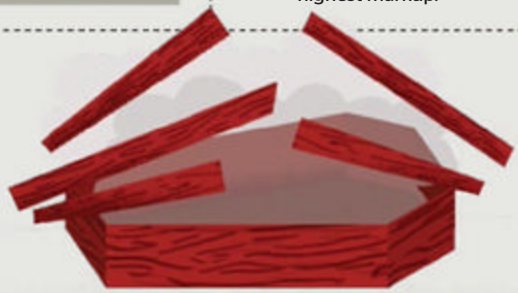
RESTAURATEURS

When you go out to dinner, you don't want to look like a total cheapskate, so you order the second-cheapest bottle of wine. Restaurateurs know your trick—the second-cheapest bottle of wine on the list is often the one with the highest markup.

FUNERAL DIRECTORS

Funeral directors know fancy caskets can be faulty—but many are happy to sell you one anyway. Though expensive caskets with rubber gaskets can keep remains from leaking, it's a bad idea to seal in the gases that corpses release. The pressure that builds can make the casket explode.

—STACY CONRADT



TOP 5

CRAFTY CRITTERS

The animal kingdom's most duplicitous members

1. Kelly the Bottlenose Dolphin

Trainers taught dolphins at Mississippi's Institute for Marine Mammal Studies to clean their pools by rounding up litter. For each piece of garbage, the dolphins earned a fish. That is, until trainers discovered that one dolphin, named Kelly, was stockpiling trash at the bottom of her pool. Each time a trainer approached, she ripped up some trash and brought it to the surface, doubling her payment for chore duty.

2. Tufted Capuchin Monkey

Tufted capuchin culture is a lot like high school. Senior monkeys relax and eat all the bananas they want, while the lower ranks are stuck on guard duty. So what do freshmen do? Pull the fire alarm. Young monkeys raise false alarms about nonexistent predators. The seniors scatter, leaving the youngsters to feast.

3. Mourning Cuttlefish

Male mourning cuttlefish are zebra-striped. Females are mottled yellow. To snag a date, some males don female colors on one side and male patterns on the other, then squeeze between a rival male and a female. The female markings confuse male suitors, while the male markings tell the female he's ready for some lovin'. When the rival drops his guard, the cross-dresser scoots in to score.

4. Margay

This small jungle cat may be beautiful, but the margay is also a shameless liar. Scientists watched a margay imitating the call of a baby pied tamarin monkey—one of its favorite snacks—to attract a gang of adult tamarins. While the cry was pretty crummy, it was convincing enough to lure the monkeys closer. Farmers throughout the Amazon basin have reported hearing ocelots, cougars, and jaguars using the same trick.

5. Koko the Western Lowland Gorilla

The world's most famous gorilla, Koko, learned more than 1,000 words and phrases in American Sign Language and even cared for her own pet cat. But she didn't always use her powers for good. One day, Koko threw a temper tantrum and ripped the sink in her room out of its base. When her human friends returned and asked what had happened, Koko signed "cat did it" and pointed at her kitten.

—KATE HOROWITZ

ISTOCK (MONKEY). ILLUSTRATIONS BY SHANNON MAY

WHERE PLANES COME FROM

Take a peek at the world's largest maternity ward—Boeing's 98-acre factory in Everett, Washington, where newborn planes are delivered every day.

PHOTOGRAPHY COURTESY OF BOEING

HOW BIG IS IT?

At 472 million cubic feet, you could fit nearly 13 Empire State Buildings inside. Or 2,142 average-sized American homes. Or all of Disneyland, with room to spare.

The plant's exterior is home to the largest digital mural in the world, a 100,000-square-foot image of planes in the sky spread across six bay doors—each the length of an NFL field.

The facility's 30,000 employees have 13,000 bicycles and tricycles at their disposal to get around.

There are 19 cafeterias inside. There's also a day care, fire department, medical clinic, electrical substations, water treatment plant, and five coffee shops. More than 1 million light bulbs keep it all lit.

The building is so big that, when it opened in 1968, it generated its own weather system: Swells of warm air caused clouds to form near the ceiling. An air-circulation system had to be installed to clear up the ceiling's skies.

It takes seven days to slap some 90 gallons of paint onto a single plane. Three hangars handle the job and, by the end, the aircraft is covered in 1,000 pounds of paint.

During World War II, Boeing needed to hide their bombers from spy planes. Another Boeing plant in Seattle solved the problem with camouflage, covering the building's roof with a smaller-than-life-size neighborhood, with lawns made of chicken wire and homes crafted from burlap. From the sky, it looked like a quaint suburb.

6 SECRETS OF SUPERMARKETS

Your local grocery store is a psychological minefield, where even the bananas are ripe with mystery.

BY **JESSICA HULLINGER** • ILLUSTRATION BY **SHANNON MAY**

SOUTHPAWS HAVE AN INVISIBLE ADVANTAGE

You've probably seen that stores keep go-to items—produce, meats, dairy—on the perimeter. But did you notice that most of them are set up to make your lap run counterclockwise? "Ninety percent of us are right-handed, so we buy more when it's counterclockwise. It puts us closer to the shelf," says Martin Lindstrom, author of *Brandwashed: Tricks Companies Use to Manipulate Our Minds and Persuade Us to Buy*. Places that do this see sales climb 7 percent. You'll also often find the dairy section in the back left corner: Because dairy is likely on your list, stores make sure you take the longest route to get there. In fairness, it's also a more convenient place to put a fridge.

EVERYTHING IN ITS PLACE

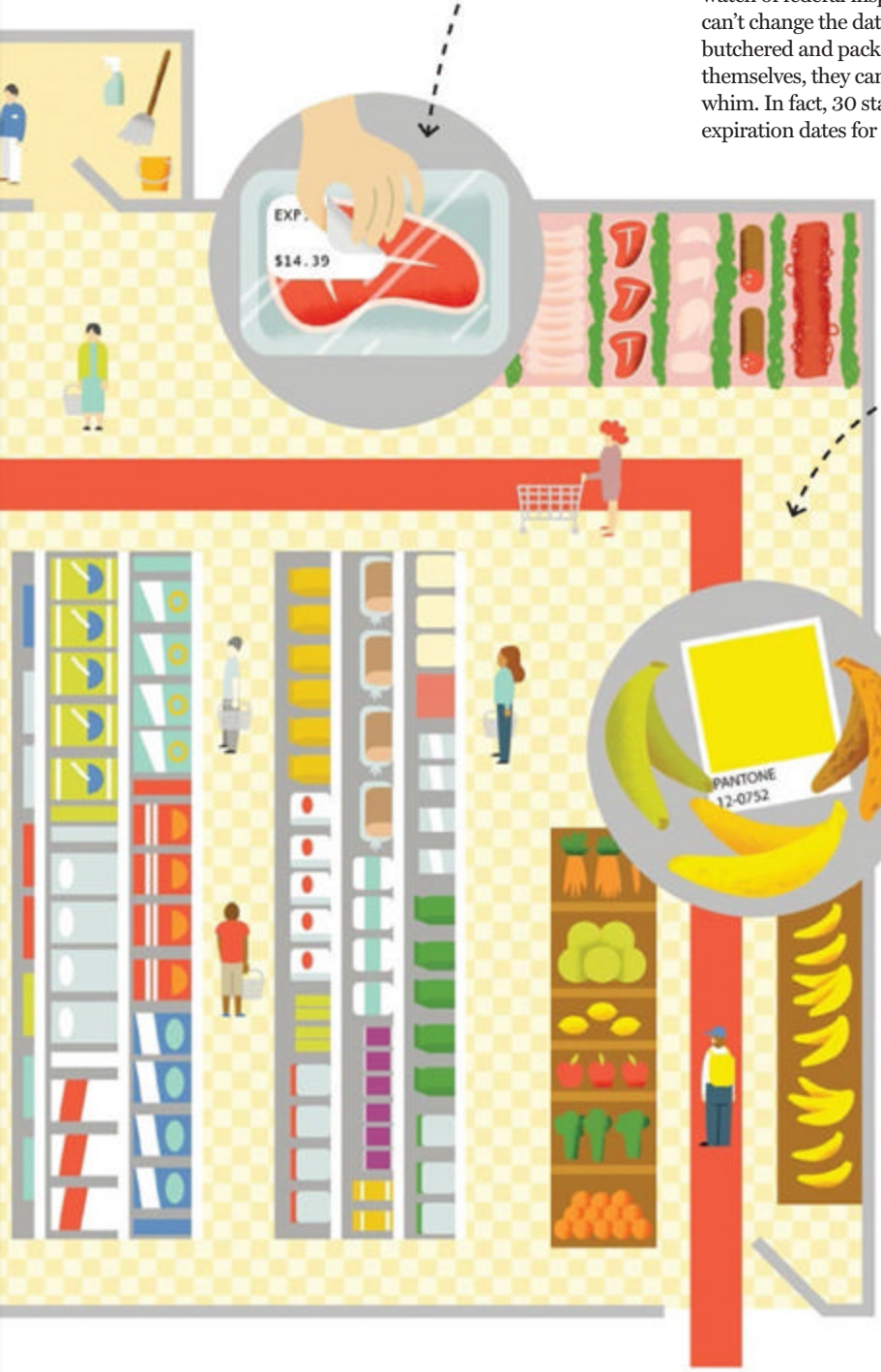
Psychologists weigh in on some store layouts. "They study buyers' behavior and they come and reset the store based on perceived habits," says Jake Sitler of Barry's Country Food Market in Craley, Pennsylvania. It's safe to say that nothing you see on a shelf is there by chance. The cookies on sale at the end of an aisle may look like a coincidental great deal, but they're likely the result of product placement—a company paid for that real estate. It's a smart spot: Besides the checkout counter, most impulse buys occur at the endcaps. More expensive items are usually placed at an adult's eye level, while colorful cereals and treats are positioned lower—to catch the gaze of children.

WHAT YOU SEE IS WHAT YOU GET

When an employee says they'll "check in the back" for an item, they're just being polite. Most stores order goods to go directly from the truck to the shelf, skipping the back room entirely. "There's an assumption we have so much stuff in our back room, and it is absolutely false," says Dara Gocheski, a former Trader Joe's employee.

THE EXPIRATION DATE ON THAT MEAT MAY BE MEANINGLESS

Matt Adams, who spent 28 years as a supermarket meat cutter, says his employer frequently used nail polish remover to wipe the sell-by date off outdated items. "You guys can't do this," he said, "What if some little old lady buys this?" It turns out you can. If meat was packaged under the watch of federal inspectors, supermarkets can't change the date. But if the retailers butchered and packaged the meat themselves, they can change the label on a whim. In fact, 30 states don't regulate the expiration dates for most items.



TIME GOES BY SO SLOWLY

Supermarkets rarely have windows or clocks. With no reference to the outside world, customers can easily lose track of how long they've been there. Grocery store overlords may use another trick to manipulate your sense of time: small floor tiles. The incessant click-clack of a shopping cart's wheels can make customers think they're racing around and encourages them to take a relaxed pace. And stores know that at a relaxed pace, customers buy more.

BANANAS ARE AN ART FORM

Bananas are so important to a supermarket's bottom line that grocers know exactly what shade of banana you're most likely to buy: Pantone color 12-0752, also known as "Buttercup." To ensure the bananas on display are the closest to this shade, stores use a ripeness scale that ranges from one (all green) to seven (yellow with brown flecks). Some stores even use special lighting to make bananas look more appealing. "They'll filter an ambient light in front of the box used to highlight the bananas so they become more yellow," Lindstrom says. As for the water sprayed on the other produce? It makes veggies look fresh, but keeping them wet actually makes them rot faster. It also makes produce heavier—and therefore pricier.

A PRIZE IN THE BAG

For ambitious baggers looking to test their skills, the National Grocers Association holds the Best Bagger Championship every year. Competitors are challenged to pack 30 to 38 items into three reusable bags as they're judged on speed, technique, weight distribution, and style. In 2014, Andrew Hadlock of Utah took home $10,000 after stuffing three bags in 38 seconds.

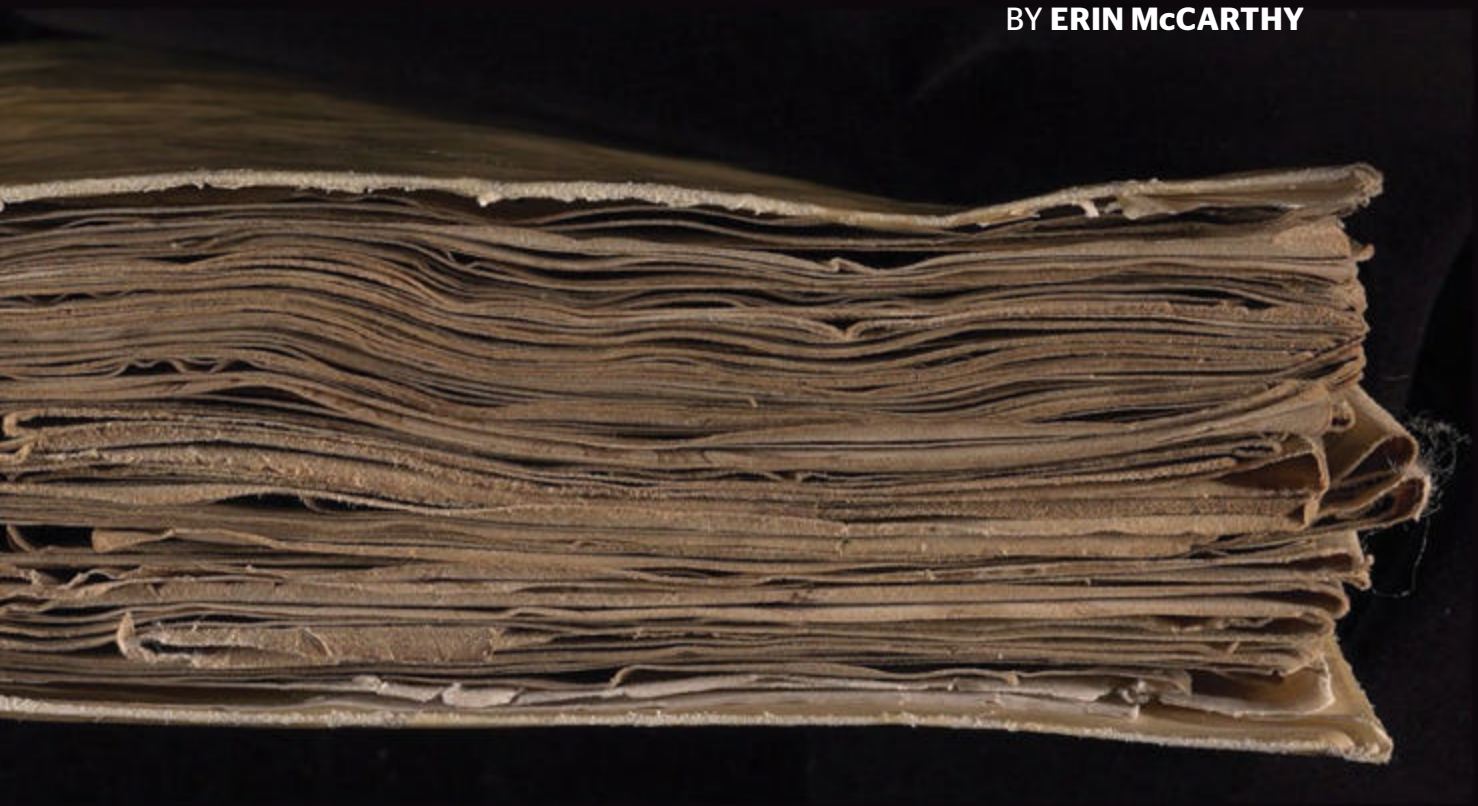
Voy

A bizarre medieval manuscript written in a language no one can read has baffled the world's best cryptologists, stumped the most powerful code-breaking computers, and been written off as a masterful hoax.

CAN THE HIVE MIND FINALLY UNLOCK ITS SECRETS?

CRACKING THE nich

BY **ERIN McCARTHY**



The breakthrough, when it finally came, happened in a most unremarkable way. Stephen Bax was in his home office late at night. It was April 2013, and he'd spent the previous 10 months poring over reproductions of a 15th-century manuscript bursting with bizarre drawings: female figures in green baths; astrological symbols; intricate geometric designs; plants that seemed familiar but also just slightly off. Strangest of all—and the reason Bax, a 54-year-old professor of applied linguistics in Bedfordshire, England, had become obsessed—were the 35,000 words in the manuscript. Written in an elaborate, beautiful script, the language has never appeared on any other document, anywhere. Ever.

At his day job at the University of Bedfordshire's Centre for Research in English Language Learning and Assessment, Bax focuses on English language learning. Decoding ancient manuscripts is not in his purview. But ever since he'd heard about this mysterious book, he'd been fixated on it: scouring the web, talking to scholars, analyzing 14th-century herbal manuscripts at the British Library. And he was fairly confident he'd identified a few words in the document: *juniper*, *cotton*, the constellation *Taurus*. But before he could go public with his findings, he needed more.

On this particular evening, he was looking at the first word of script on a page numbered f3v, which contained an illustration of a plant that looked like hellebore. According to the scheme Bax had worked out, the word spelled out *kaur*—a word he wasn't familiar with. So Bax did what anyone would do: He pulled up Google and typed "hellebore" and "kaur." Then he pressed enter.

THE VOYNICH MANUSCRIPT—A SOFT-bound, 240-page volume—has baffled cryptanalysts, linguists, computer scientists, physicists, historians, and academics since it was rediscovered in the early 20th century. To date, no one has deciphered it, and no one knows why it was made. Experts don't know what to make of it: is it a cipher, a code, a long-lost language?

There's been plenty of speculation, both inside and outside academia. Over the past century, the case of the Voynich has been cracked and debunked, cracked and debunked again, and even—rather convincingly!—exposed as a hoax. Even the book's acquisition is a mystery.

The story starts with a London-based book dealer named Wilfrid Voynich, who discovered the book in 1912. From the beginning, Voynich was evasive about how he acquired the tome—he claimed he'd been sworn to secrecy about its origin, and the story he recounted changed often. In the one he told most frequently, he'd been at "an ancient castle in Southern Europe" when he found this "ugly duckling" buried in a "most remarkable collection of precious illuminated manuscripts."

For a book dealer, it was like stumbling onto treasure. Back in London he dubbed his acquisition the "Roger Bacon cipher," after the 13th-century English monk and scientist, and put it up for sale. A letter that came with the book suggested Bacon was the author; whether Voynich actually believed it, or whether he simply believed that associating the book with Bacon would help him fetch a higher resale price, is unclear.

"I think he's best compared to a used car dealer," says René Zandbergen, a space scientist who lives near Darmstadt, Germany, and runs a Voynich website in his spare time. "He was selling

The book is full of weird drawings of plants—but Stephen Bax believes he's unraveled text that identifies the one at left as black hellebore.

secondhand books and making sure that this [one] would get the best price he could get."

By 1919, Voynich had sent copies of the manuscript to experts who might be able to determine the book's purpose. One of those men was William Romaine Newbold, a philosophy professor at the University of Pennsylvania. Taking a magnifying glass to the text, Newbold noticed strange irregularities at the edges of the letters. He believed the tiny lines were Greek shorthand—and that each letter contained as many as 10 of them. The letters themselves, he thought, were meaningless. But the shorthand might hold the key to decoding the manuscript.

Newbold converted the script to letters, and then anagrammed until he found readable text. His translation seemed to corroborate Voynich's hunch: The manuscript had belonged to Bacon, and the illustrations showed that the friar scientist had made incredible discoveries. One drawing, Newbold believed, showed the spiral-shaped Andromeda Galaxy—hundreds of years before astronomers would discern the galaxy's structure—and others showed cells. Newbold surmised that this meant Bacon would have had to have invented both the telescope and the microscope. If his contemporaries had known what he was up to, Newbold theorized, they'd have accused him of working with the devil: That's why he had to use a cipher to record his findings.

FOR A CENTURY, THE CASE HAS BEEN CRACKED AND DEBUNKED, AGAIN AND AGAIN.

Word of the manuscript spread. In 1931, John M. Manly, a Chaucer expert at the University of Chicago—who'd been "dabbling" with the manuscript for years—published a paper that erased Newbold's findings: Those irregularities at the edge of the letters weren't shorthand; they were simply cracks in the ink.

But Manly's discovery only fueled the public's desire to understand the mysterious manuscript. Before long, experts from every field had joined the effort: Renaissance art historians, herbalists, lawyers, British intelligence, and teams of amateurs. Even William Friedman,

THE BEINECKE RARE BOOK & MANUSCRIPT LIBRARY, DIGITAL STUDIO

who had led the team that solved Japan's "unbreakable" Purple cipher in World War II and had since become head cryptanalyst at the National Security Agency, took a crack at it. He never got close to solving it.

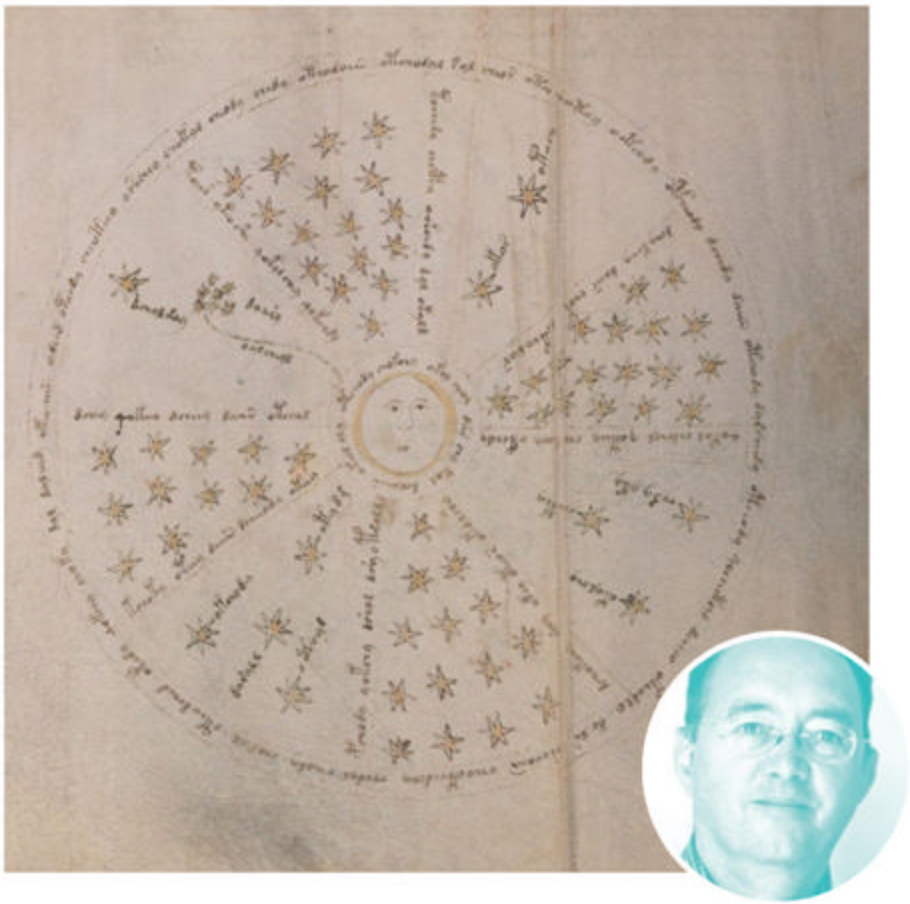
There are lots of questions surrounding the Voynich manuscript, but the most essential is: What is it? Because of the numerous illustrations of plants, many believe the manuscript may be an herbalist's textbook, written in some kind of cipher or code—and the two terms are not synonymous. Technically, a code can only be cracked if you have—or can figure out—the guide to that code. A cipher is a more flexible algorithm, say, where one letter is substituted for another. (For a simple example, *a* = *p*.)

There are a number of ways to crack a cipher, but one common technique is frequency analysis. You count all the characters, find which are most common, and match that against a similar pattern in a known language. More elaborate ciphers might require different kinds of frequency analysis or other mathematical methods.

What Friedman saw—and what makes the Voynich so compelling—is that the text isn't random. There are clear patterns. "There's a set number of characters, an 'alphabet' with letters that repeat," says Elonka Dunin, a Nashville video game designer who created her own page-for-page replica of the Voynich (just for fun!). But she has doubts that the book is a cipher. "Ciphers back then were just not that sophisticated. With modern computers, we can crack these things quite quickly." But a computer hasn't yet, and that's a red flag.

Back in 1959, Friedman came to the same conclusion. Never able to crack the code, he believed the text was "an early attempt to construct an artificial or universal language of the a priori type"—in other words, a language made up from scratch. Some agree. But others think the words might be a language of another kind. Which brings us to Bax.

IT TOOK A SPLIT SECOND FOR BAX'S Google results to confirm that *kaur* was a name in Indian herbal guides for black hellebore. It was a match! "I almost jumped up and down," he says. "All of the months and months of work were starting to show some cracks in the armor of the manuscript." That night, he couldn't sleep. He kept going over the research in his head, expecting to come up with a mistake.



Some people see similarities between the book and the Tarot. Bax (inset) is soliciting opinions online.

If he was right—if certain words were identifiable as plant names—then his findings agreed with Friedman: The book was not a cipher. But unlike Friedman, Bax didn't think the language was made up. He was convinced that it resembled a natural language. He's not alone. One study of the Voynich, published in 2013 by Marcelo Montemurro and Damián Zanette, noted that statistical analysis of the manuscript showed that the text has certain organizational structures comparable to known languages. The most commonly used words are relatively simple constructions (think *the* or *a*), while more infrequent words, those that might be used to convey specific concepts, have structural similarities, the way many verbs and nouns do in other languages.

However, there are quirks. In most languages, certain word combinations recur frequently; but according to Zandbergen, that rarely happens in the Voynich. The words tend to have a prefix, a root, and a suffix, and while some have all three, others have only one or two. So you can get words that combine just a prefix and a suffix—*uning*, for example. Further, there are no two-letter words or words with more than 10 characters, which is strange for a European language. That's enough to put some people off the idea that it could be a natural language.

When Bax started working with the text, he treated it like Egyptian hieroglyphics. He borrowed an approach used by Thomas Young and Jean-François Champollion, who in 1822 used the proper names of pharaohs—easy to identify because they were marked with a special outline—to work backward, assigning sound values to the symbols and then extrapolating other words from these. This was something that, Bax says, no one had systematically attempted on the Voynich.

The first proper name Bax identified was a word next to an illustration of a group of stars resembling Pleiades. "People before us suggested that that particular word is probably related to Taurus," he says. "If you assume it says *Taurus*, the first sound must be a *ta*, or somewhere in that region—*ta, da, Taurus, Daurus*." The

process seems insanely daunting at first: "On the basis of one word alone, that's just complete imagination," he says. "But then you take that possible *ta* sound and you look at other possible proper nouns through the manuscript and see if you can see a pattern emerging."

Bax worked for a year and a half, deciphering crumbs of letter-sound correspondences. Eight months after he confirmed *hellebore*, he published a paper online detailing his method. He cautiously announced the "provisional and partial" decoding of 10 words, including *juniper, hellebore, coriander, nigella sativa, Centaurea,* and the constellation *Taurus*.

University of Bedfordshire professor cracks code to mysterious 15th-century Voynich manuscript, the local paper blared. Quickly, news organizations around the world joined in.

NOTHING MAJOR HAPPENS IN THE long saga of the Voynich without media hype. The last time it had happened, in 2004, a British computer scientist named Gordon Rugg had published a paper showing that the whole thing might be an elaborate hoax created expressly to separate a wealthy buyer from a lot of money. And where there's media controversy, there's contention among Voynich obsessives. Rugg says his theory was like "someone grabbing the football and walking off the pitch in the middle of a really fun game."

Bax's proclamation came with its share of controversy, too. People in the Voynich world have seen a lot of so-called cracks over the years, none of which have panned out, so when the news stories appeared on Bax's paper, Dunin, the video game designer, just laughed. "The media just picks it up uncritically and says, 'He must have solved it.' He didn't," she says. "He's saying, 'I saw this, and this looked intriguing,' and that's perfectly valid. But it's not a crack." Others criticized his methods: Some had issues with the idea that the first word on a page is a plant name, because many of those words start with one of only two letters. Some found it weird that his translation has three different characters that stand for the letter *r*.

Bax doesn't claim he's cracked the code. "I'm prepared to see that some of the interpretations I've suggested are revised or even thrown out," he says. "That's the way you make progress on something like this. But I'm pretty convinced that a lot of it is solid."

He's determined to prove it, by stoking more dialogue within the obsessive community. In addition to the Voynich Wikipedia page, there's an entire Wiki devoted to the book's oddities and the efforts to crack it. Mailing lists started in the early 1990s are still going strong. Reddit, too, has taken an interest, and when Bax did an AMA after publishing his paper, it got 100,000 pageviews. Bax himself has set up a website to document his efforts. He actively encourages participation, fielding comments from visitors eager to help him decode the book.

One such volunteer is Milan-based Marco Ponzi, who had been researching Tarot card history when he found Bax's paper. Ponzi began commenting on Bax's website, suggesting there might be parallels between certain diagrams in the volume and images that appear in the Tarot. "Since Stephen is so rigorous and so kind, I feel encouraged to propose new ideas," he says. "I don't know if I have contributed anything really useful, but it is very fun."

"Marco is bringing his expertise in medieval art, iconography, and Italian manuscripts—which I don't have," says Bax. "This is one of the beauties of doing it through the web." Indeed, it's become an international collaboration. Bax has asked other readers to add their own observations in the comments section, and spends a lot of time responding to queries and participating in the discussion. In the future, he hopes to host conferences and seminars about the book, and to set up a site where he can crowdsource efforts to decode other Voynich sections. If the method works, he expects that the manuscript could be decoded within four years.

What will be revealed when—and if—it is? Bax believes the manuscript is a treatise on the natural world, written in a script invented to record a previously unwritten language or dialect—possibly a Near Eastern one—created by a small community that later disappeared. "If it did turn out to be from a group of people who have disappeared," he says, "it could unlock a whole area of a particular country or a group that is completely unknown to us."

Other theories put forth that the secrets locked inside the Voynich's vellum pages could reveal a coming apocalypse—or merely the details of medieval hygiene. Some people think the script could be the observations of a traveler who was trying to learn a language like Arabic or Chinese, or a stream-of-consciousness recording of someone in a trance. The most bizarre theories involve aliens or a long-lost underground race of lizard people.

It's possible that the book will never tell us anything. To Zandbergen, whether it has huge secrets to reveal doesn't matter at all. He just wants to know why the book was written. Whether it's the work of a hoaxer, an herbalist, or a lizard person, the Voynich is important all the same. "It's still a manuscript from the 15th century. It has historical value," he says. But until the truth is revealed—and probably even after—people will keep trying to crack the Voynich. After all, who doesn't love a good puzzle?

THE SECRETS LOCKED INSIDE THE VOYNICH'S PAGES COULD REVEAL A COMING APOCALYPSE—OR MERELY THE DETAILS OF MEDIEVAL HYGIENE.

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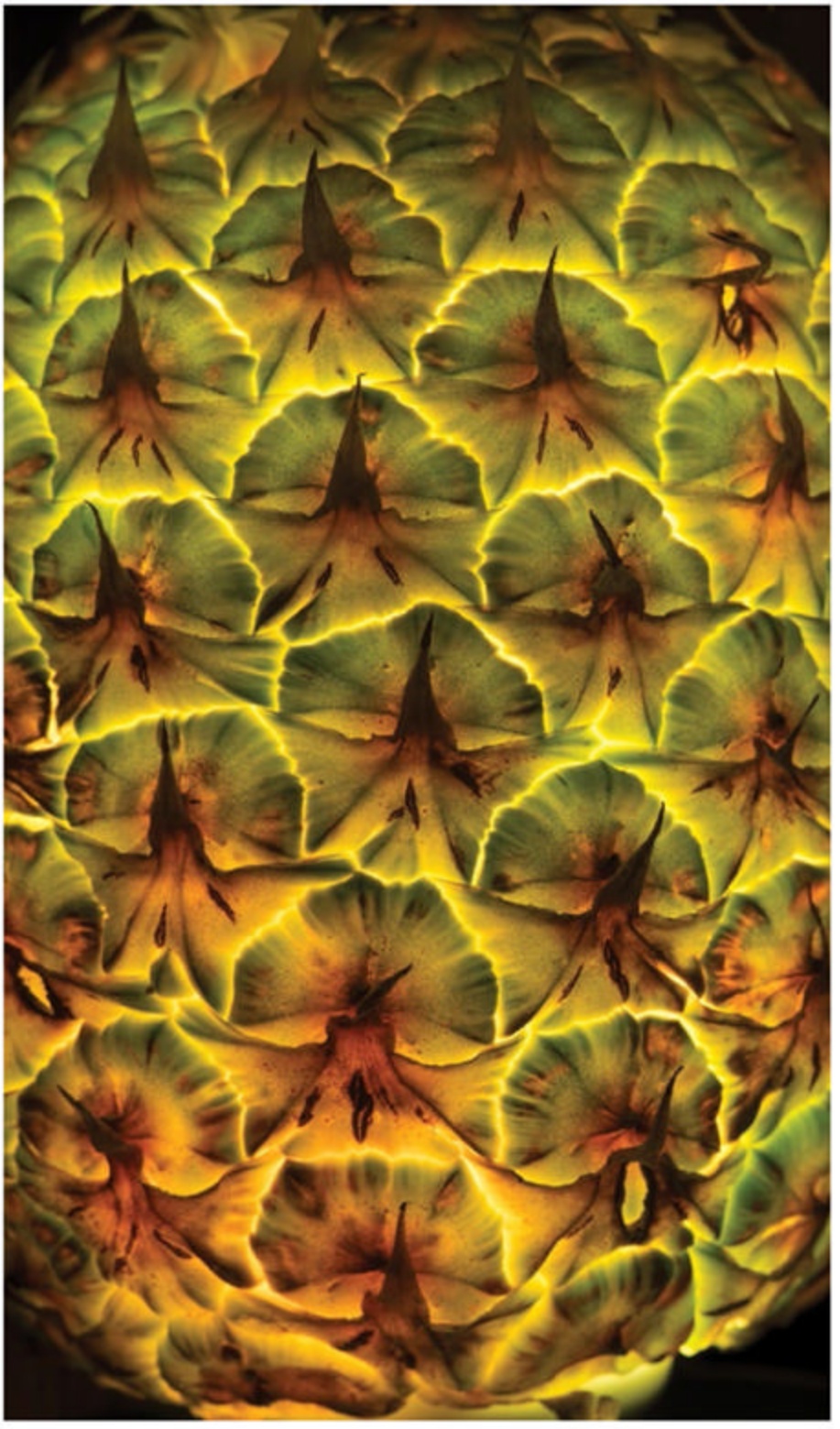


THE LIGHT INSIDE COURTESY OF RADU ZACIU

A Fruitful Glow

The German word for light bulb is *glüehbirne*, which translates to "glowing pear." Learning this gave Romanian photographer Radu Zaciu an idea: "I introduced a small light bulb into a pear." The result was the first subject of his photo series "The Light Inside," which illuminates everyday edibles to mesmerizing effect. "When I saw how beautiful the surface of the fruit looked," he says, "I decided to try the same

with other fruits and vegetables." Initially, he carved into the produce, but found it difficult to disperse the light evenly. So he started drilling into fruits and vegetables and experimenting with different bulbs to accommodate varying sizes. Finding the best food for the job also required some trial and error. Bell peppers and tomatoes were too smooth and looked dull. Cauliflower, on the other hand, was surprisingly beautiful—the illuminated head lit up like a mushroom cloud. Cantaloupes became neon dreams, celery root turned otherworldly, and the original pear? Well, it looked like a light bulb.

—CAITLIN SCHNEIDER

See "The Light Inside," by Radu Zaciu, at Flickr.com/photos/cold_shutterhand.

Pop Culture Syllabus: *SUPERHEROES*

HEAD OF THE CLASS

James Kakalios, a professor at the University of Minnesota, teaches the hit freshman seminar "Everything I Needed to Know About Physics I Learned From Reading Comic Books." His course, summed up in this book, explains how the Flash can catch a bullet (according to Einstein's Special Theory of Relativity, the Flash and the bullet travel at the same speed); how Spider-Man can lift a car with his webbing (spider silk is stronger than steel); and how Superman can leap tall buildings in a single bound (according to Newton's second and third laws of motion, the gravitational force of Krypton is 15 times stronger than Earth's).

READ *The Physics of Superheroes: Spectacular Second Edition,* by James Kakalios

SUPERHEROES, DEBUNKED

Like a Snopes for comic-book fans, Brian Cronin has used his website to fact-check more than 500 urban legends about superheroes. He reveals why the Hulk is green (grey was harder to print), how the Fantastic Four's the Thing was intended to be Jewish and Wolverine was meant to be an actual wolverine, and that Batman once had an older brother in an insane asylum. One story explains how Nazis publicly rebuked a 1940 comic showing Superman fighting for the Allies. The SS weekly newspaper charged that this "colorful figure with an impressive appearance, a powerful body, and a red swim suit ... sows hate, suspicion, evil, laziness, and criminality in young [American] hearts."

CLICK goodcomics.comicbookresources.com/category/comic-book-urban-legends-revealed

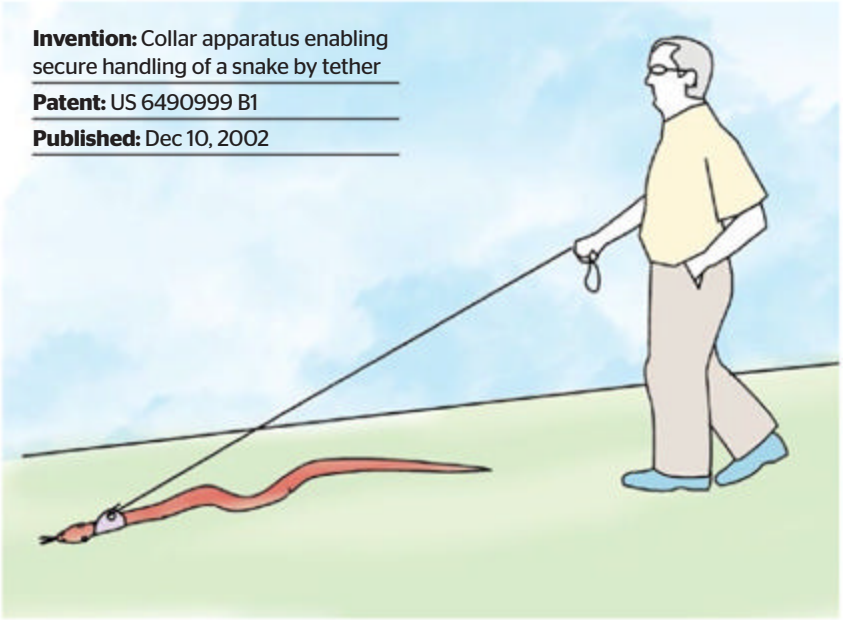
EXTREME MAKEOVER: BATMAN EDITION

Could you become Batman? A professor of biomechanics—who happens to hold two black belts—analyzes how your body would handle the rigor of caped-crusading. It would take a diet of 3,500 to 4,000 calories a day (60% carbs, 25% protein, 15% fat), 127 types of kung fu, and exceptional hardening of the skin and bones (the author suggests punching a wall). He rates much of Batman's lore as surprisingly plausible, with a few exceptions. For instance, fighting 10 thugs at once would overwhelm the cognitive load.

READ *Becoming Batman,* by E. Paul Zehr. (Further reading: Zehr's follow-up, *Inventing Iron Man: The Possibility of a Human Machine.*)

THE LIGHT INSIDE COURTESY OF RADU ZACIU. ALAMY (COMICS)

Patently Absurd: *SNAKE WALKER*



Invention: Collar apparatus enabling secure handling of a snake by tether

Patent: US 6490999 B1

Published: Dec 10, 2002

For all its virtues, having a pet snake is no walk in the park. Especially when you want to take it on a walk in the park. As noted in Patent 6,490,999, "Letting a snake go in a living room or outside can result in loss of the snake, as it may slither into a crevice, hole, or other hideaway unnoticed, making it difficult if not impossible to retrieve the snake." How can a responsible snake-wrangler get a cold-blooded friend outside to soak up some epidermal-boosting sunshine? A snake walker, of course. This handy device allows snake owners to leash up the serpent. It boasts a movement neutralizer, support system, and an "elongated rod" for handling the scaly companion.

May 9th and 10th *NATIONALE MOLENDAG*[1]

HOT DATE!

3 Things to Know About Windmills

- The band They Might Be Giants got their name from *Don Quixote*, in which Don thinks windmills are giants on the attack.
- The first-ever airborne windmill is being tested over Fairbanks, Alaska. The blades are kept afloat inside a giant helium balloon tube.
- Engineers in Texas are building micro-windmills—about one tenth the size of a grain of rice—to power electronics.

[1] The Netherland's annual celebration of windmills.

THE PAPER TRAIL

Our favorite reads right now

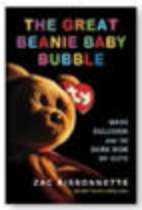
BRAIN CANDY → BRAIN KALE

Coffee Gives Me Superpowers
by Ryoko Iwata (Andrew McMeel Publishing, $10)

This illustrated homage to the "most awesome" drink on earth explains how to live your best java-based life, from the ideal time to drink it (2 p.m., when most people's energy hits empty) to the maximum number of cups you should have (cap it at 99 for safety; 100 is lethal).

Conversation Sparks: Trivia Worth Talking About
by Ryan Chapman (Chronicle Books, $13)

Did you know that can openers were invented 48 years after cans? That Oxford University is older than the Aztecs? Or that 80 percent of the world's avocados are descended from a single tree in California that mailman Rudolph Hass planted in the 1920s? Well, now you do.



The Great Beanie Baby Bubble: Mass Delusion and the Dark Side of Cute
by Zac Bissonnette (Portfolio, $27)

Hoppity Bunny (DOB: April 3, 1996) has a dark side. This account of the rise and fall of the Beanie Baby craze—which led to one murder and a single-sale total of $10,000 for the "#1 Bear"—may not be cuddly or cute, but it's fascinating.

So You've Been Publicly Shamed
by Jon Ronson (Riverhead Books, $27.95)

In December 2013, there were 12.2 billion Google searches. 1.2 million of them were for "Justine Sacco," the PR rep who was Internet shamed after a Twitter catastrophe. In this compelling work, Ronson explores incidents of digital "crime and punishment," why we engage in them, and how we can stop.

Cool: How the Brain's Hidden Quest for Cool Drives Our Economy and Shapes Our World
by Steven Quartz and Anette Asp (Farrar, Straus and Giroux, $26)

In the 1950s, American purchasing patterns shifted, with "cool" driving a new rebellious form of consumption. This engrossing history merges evolutionary biology and economics to explain our spending habits.

ISTOCK (WINDMILL)

BY LUCAS ADAMS

NAME: _____ AGE: _____

HIDDEN TALENT: _____

1 What is walrus ivory called?

A) Yupik bone
B) Ice ivory
C) Morse
D) Tusk

2 'Gerrymander' is a portmanteau of Gerry—for former Massachusetts governor Elbridge Gerry—and what other word?
A) Salamander
B) Slander
C) Meander
D) Commander

3 What name was originally proposed for Uranus?
A) George's Star
B) Caelus
C) Flamsteed
D) Brantisvogan

4 A light rail station in Kiev, Ukraine, is named after which American author?
A) Theodore Dreiser
B) O. Henry
C) John Reed
D) Harriet Beecher Stowe

5 Jazz legend Billie Holiday babysat what future actor?

A) Sigourney Weaver

B) Dan Aykroyd

C) Billy Crystal

D) Kirstie Alley

6 Which 1960s TV show had a theme park until 2004?
A) *The Twilight Zone*
B) *Bonanza*
C) *The Munsters*
D) *Gomer Pyle, U.S.M.C.*

7 During the first half of the 20th century, which was the dominant handwriting method in America?
A) Spencerian Script
B) Right writing
C) Palmer Method
D) Super Cursive

8 What fruit is also called an "alligator pear"?
A) Mango
B) Lime
C) Kiwi
D) Avocado

9 Which boxer boasted, "I can whip any mechanical robot that ever has or ever will be made"?
A) Laila Ali
B) Jack Dempsey
C) Joe Frazier
D) Lucia Rijker

10 The planned Soviet city of Magnitogorsk was built to replicate what American city?
A) Gary, Indiana
B) Allentown, Pennsylvania
C) Detroit, Michigan
D) Richmond, Virginia

11 What is a strake?
A) The metal holding a pencil eraser
B) Cannon repairman
C) Industrial barnacle cleaner
D) Part of a ship's hull

12 What job did Ray Kroc and Walt Disney have during World War I?
A) Ambulance driver
B) Airplane mechanic
C) Spy
D) Nurse

13 What is Delftware?
A) Dutch pottery
B) ARPANET software
C) Failed Tupperware prototype
D) Norwegian computer virus

14 Which of these isn't a type of screwdriver?
A) Torx
B) Spline drive
C) Dual correlator
D) Pentalobular

15 When people in Victorian Ireland and England couldn't afford chimney sweeps, they were advised to drop what down their chimney?
A) Old carpets
B) A live goose
C) Mops
D) 50 pounds of wool

ANSWERS
1. C (Until the 19th century, walruses were also called "morses.")
2. A
3. A (For King George III. Sir William Herschel also suggested calling it "The Georgian Planet")
4. A (The station's name is Teodora Draizera)
5. C
6. B (It was called "Ponderosa Ranch.")
7. C (It lost favor to block printing in schools.)
8. D
9. B
10. A (The Soviets admired Gary's steel mills.)
11. D (The metal holding a pencil eraser is a *ferrule*.)
12. A (They met during training)
13. A
14. C
15. B

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5-7 The Best
8-9 The Worst
10-15 Also Pretty Good

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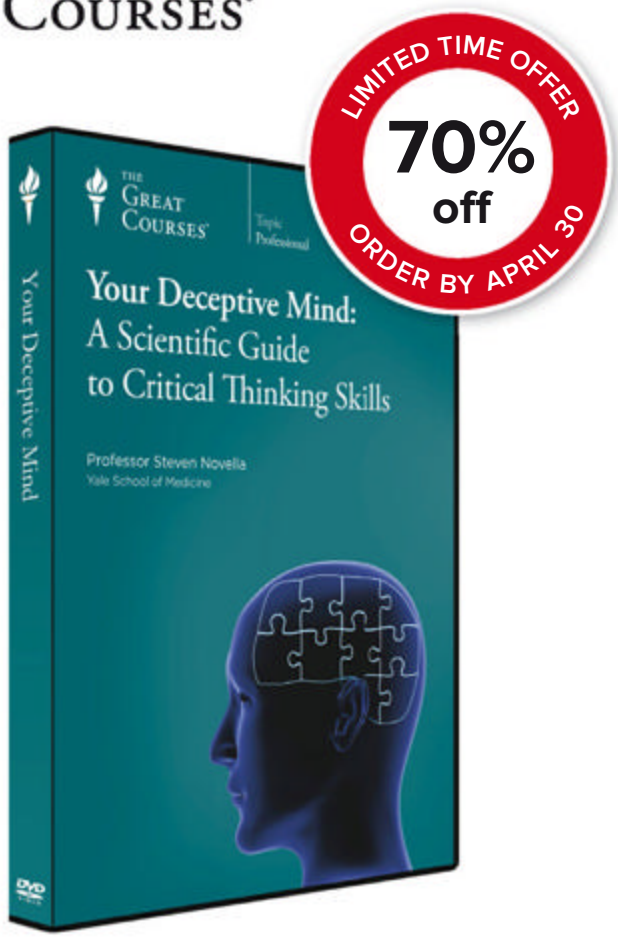

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16. Great Scientific Blunders
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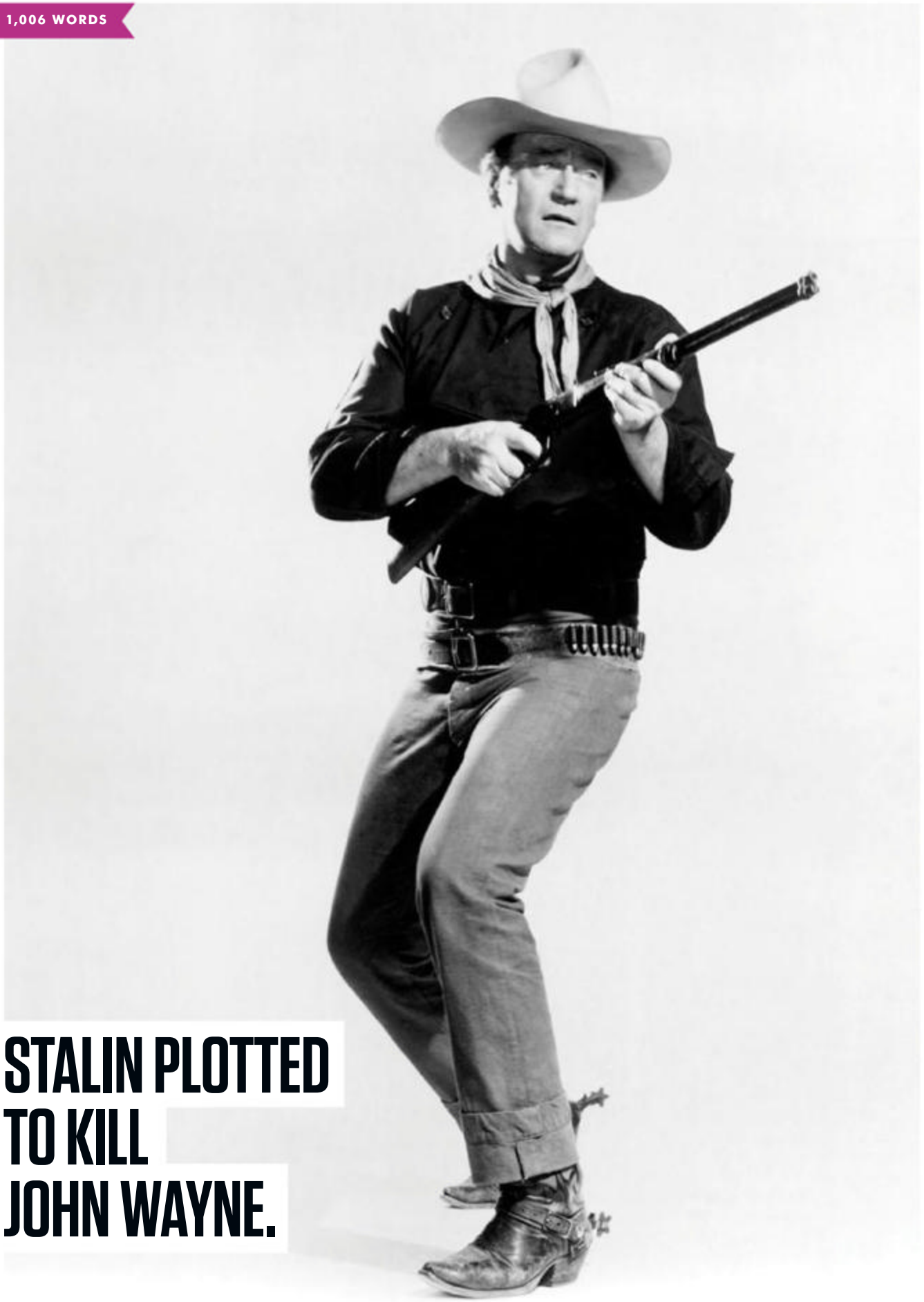
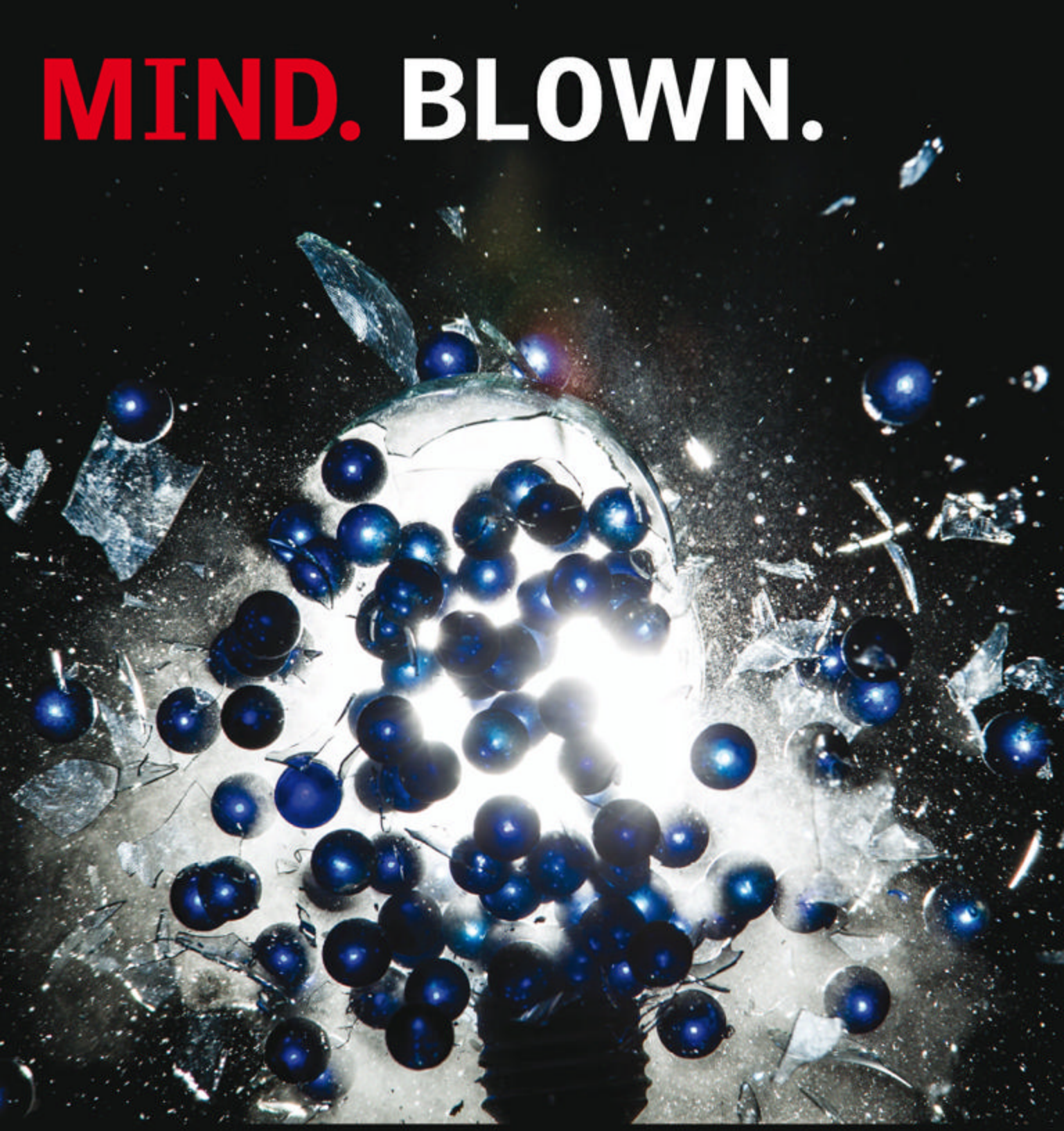


STALIN PLOTTED TO KILL JOHN WAYNE.

ALAMY

MIND. BLOWN.



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